

FIG. 1
(PRIOR ART)

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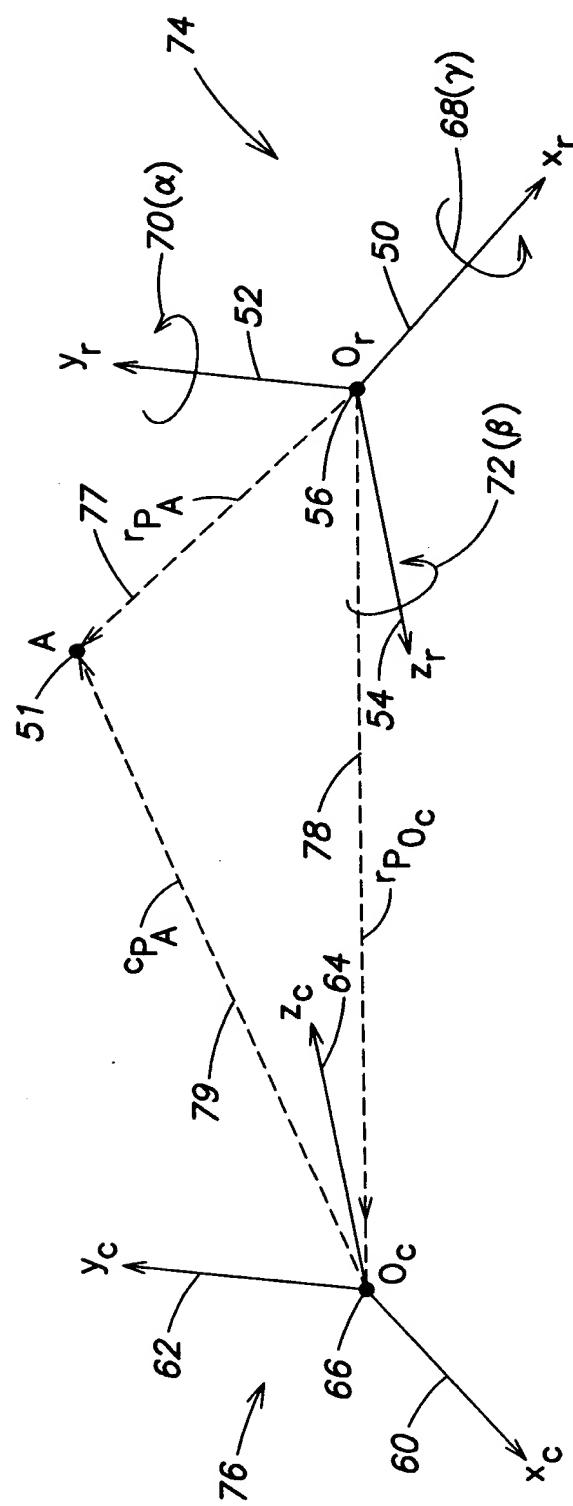


FIG. 2
(PRIOR ART)

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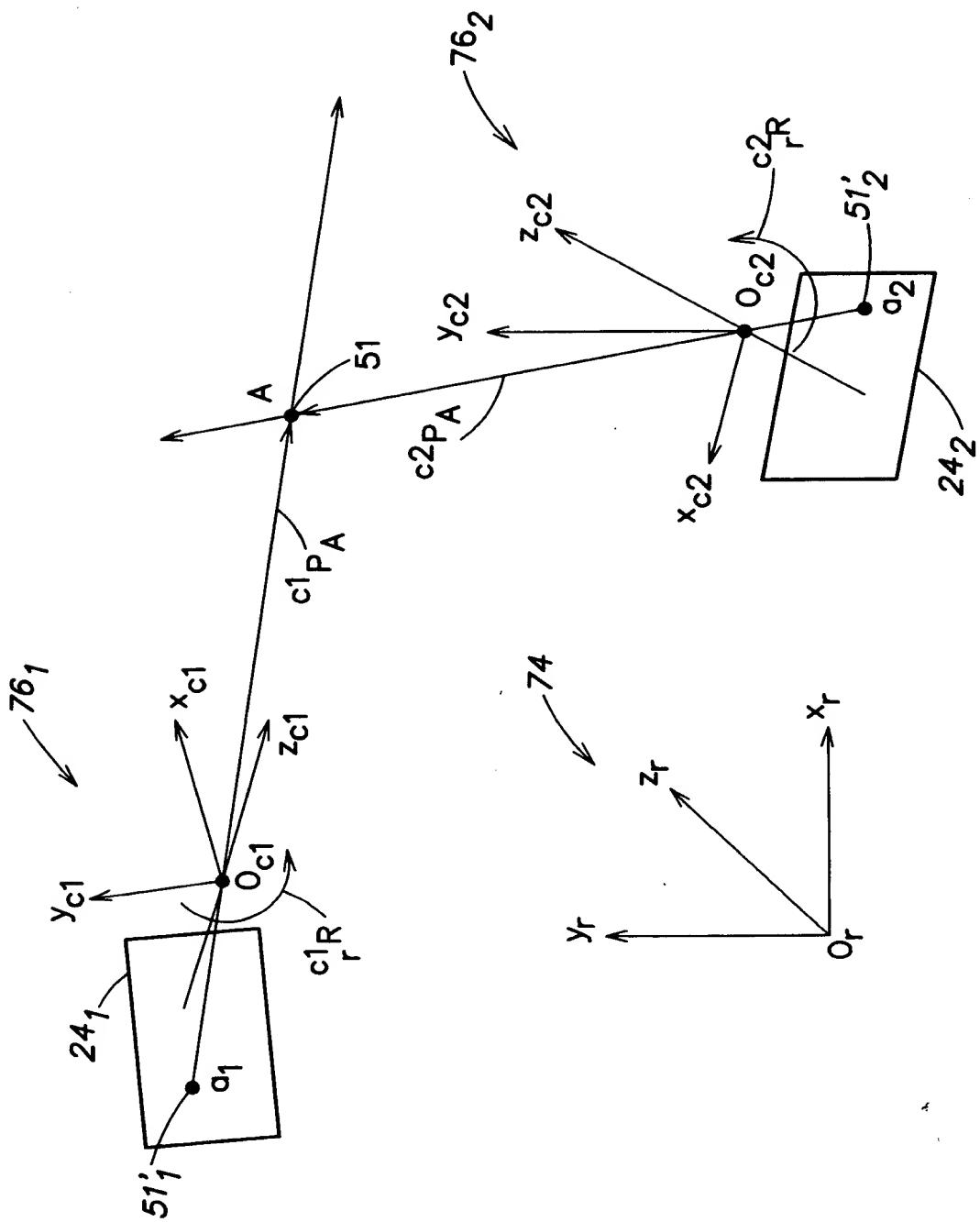


FIG. 3
(PRIOR ART)

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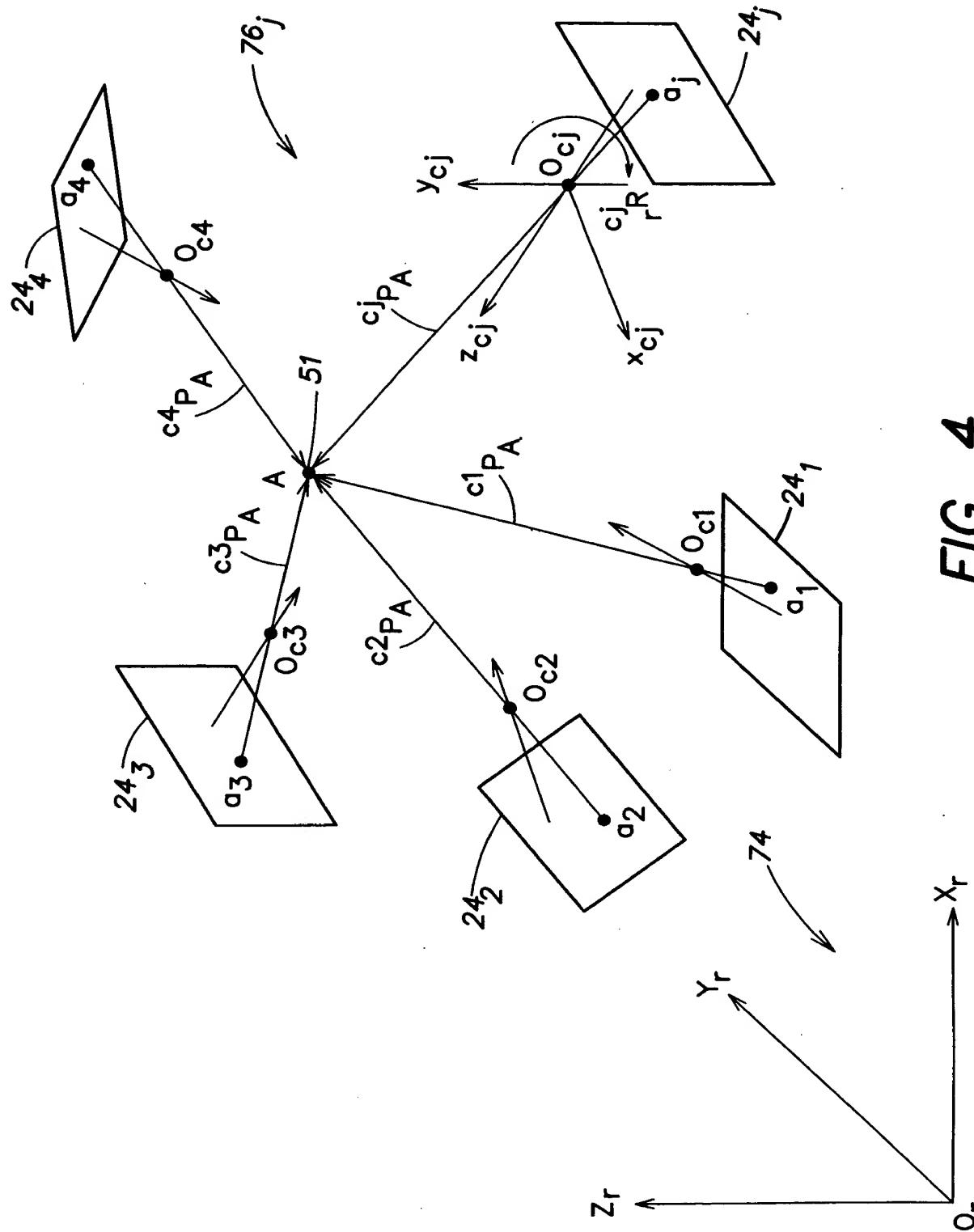


FIG. 4
(PRIOR ART)

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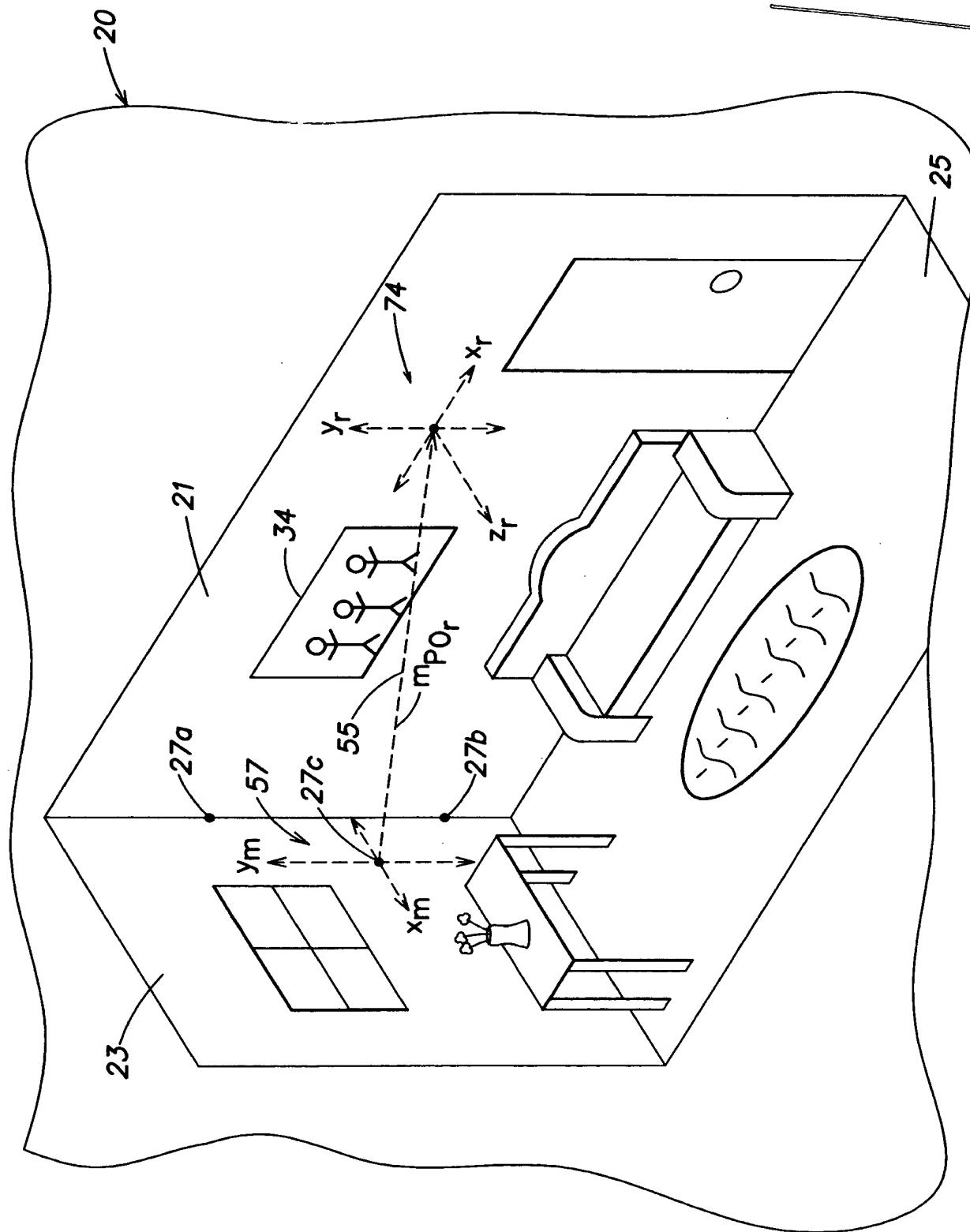


FIG. 5

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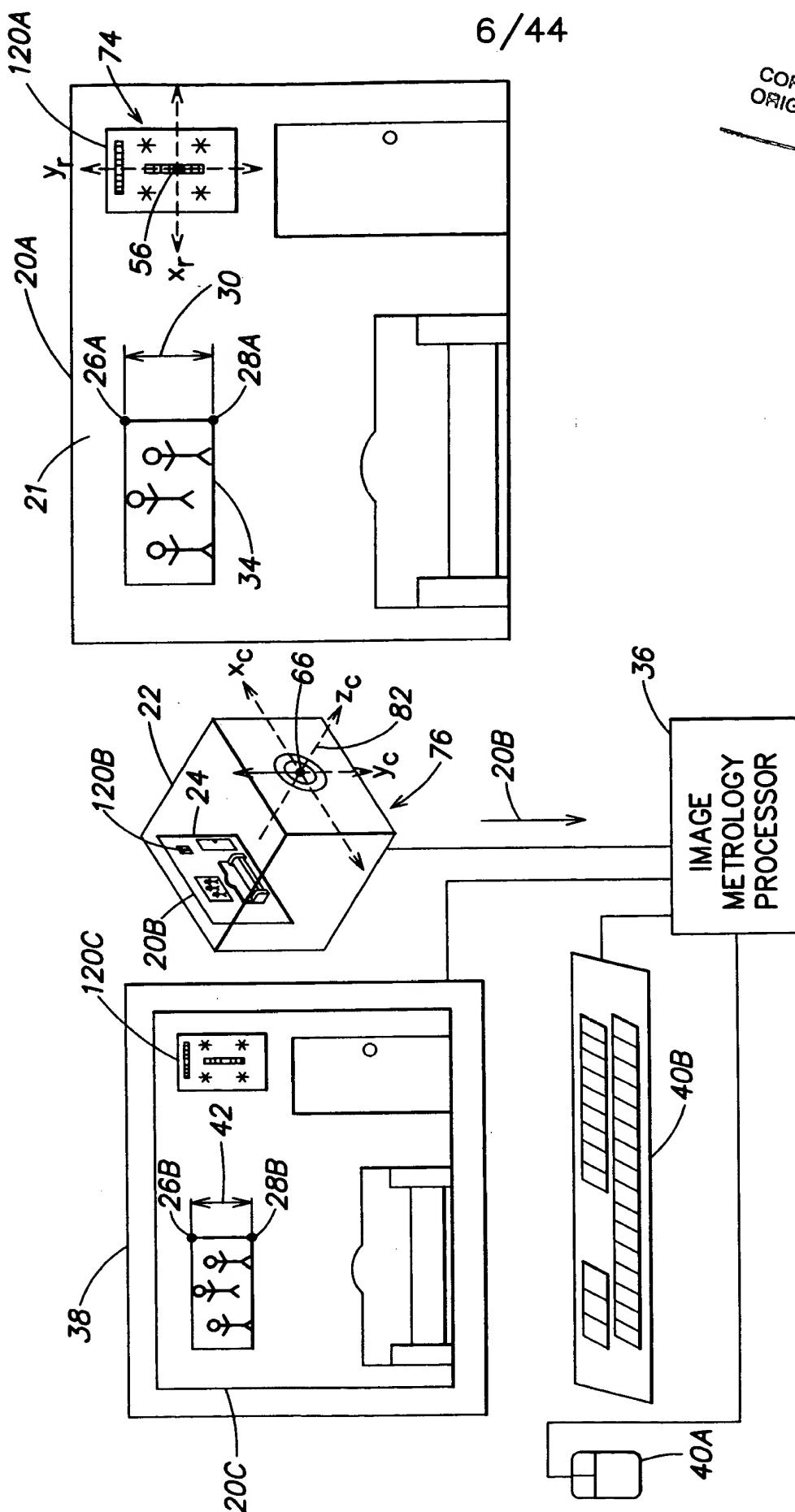


FIG. 6

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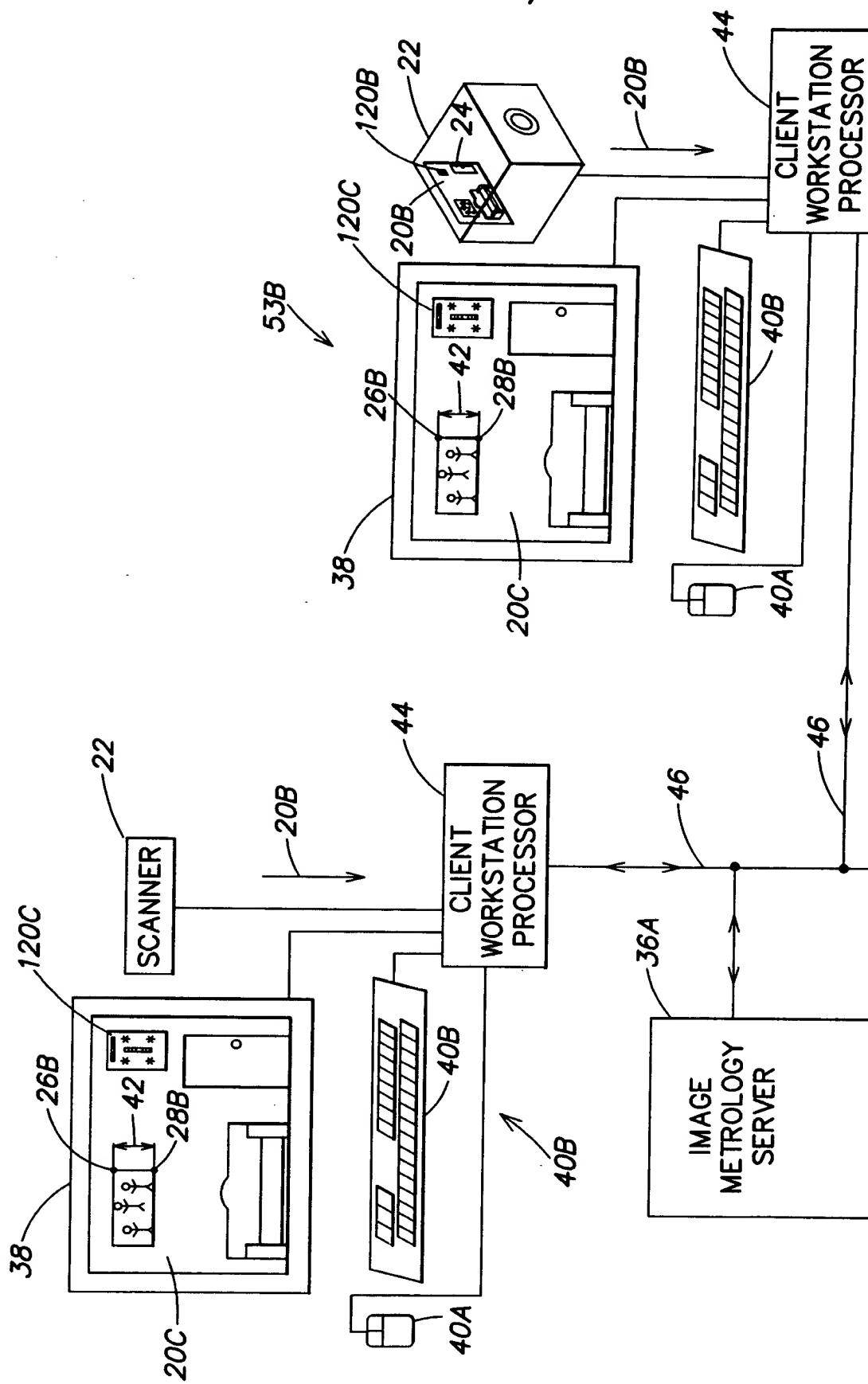


FIG. 7

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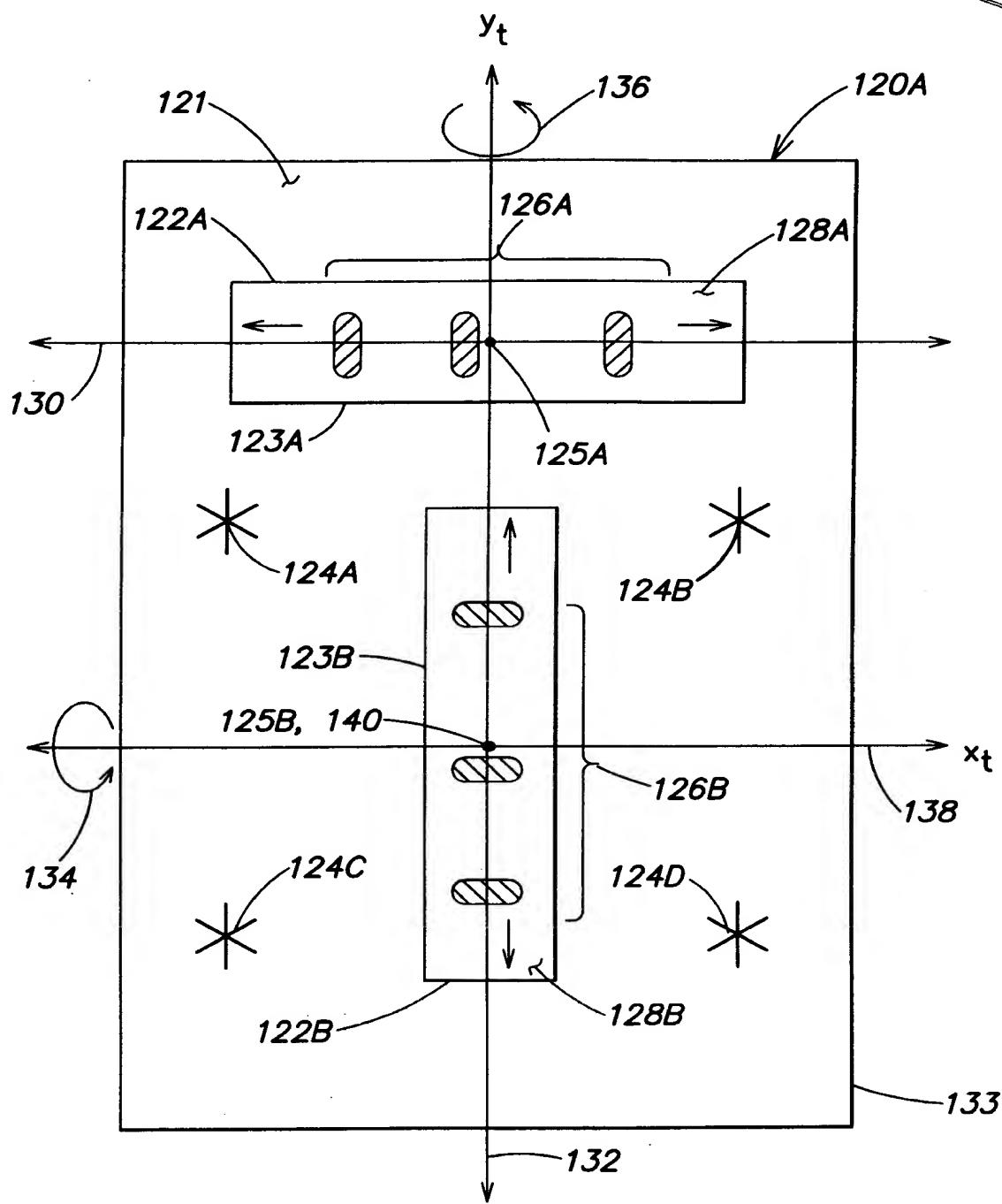


FIG. 8

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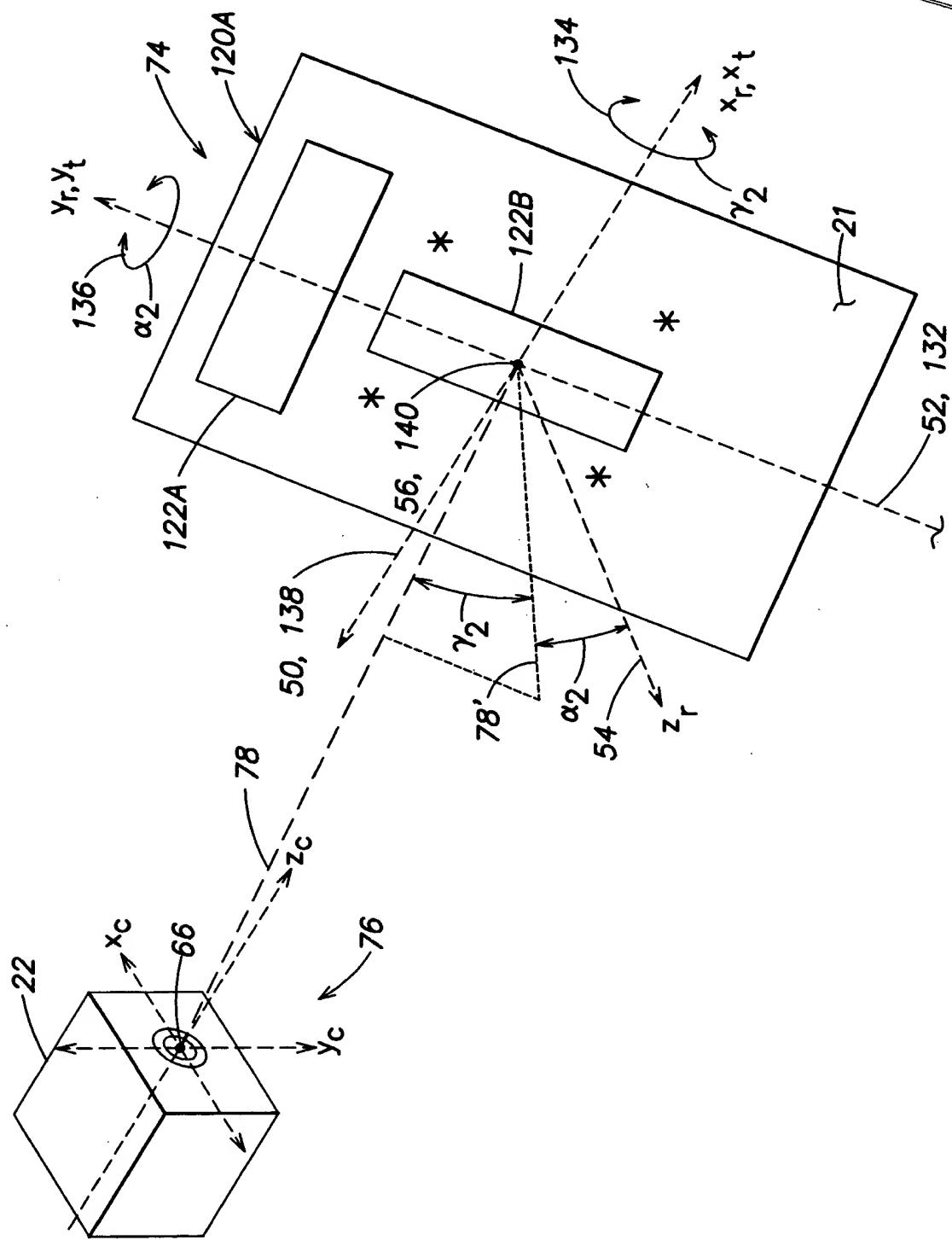


FIG. 9

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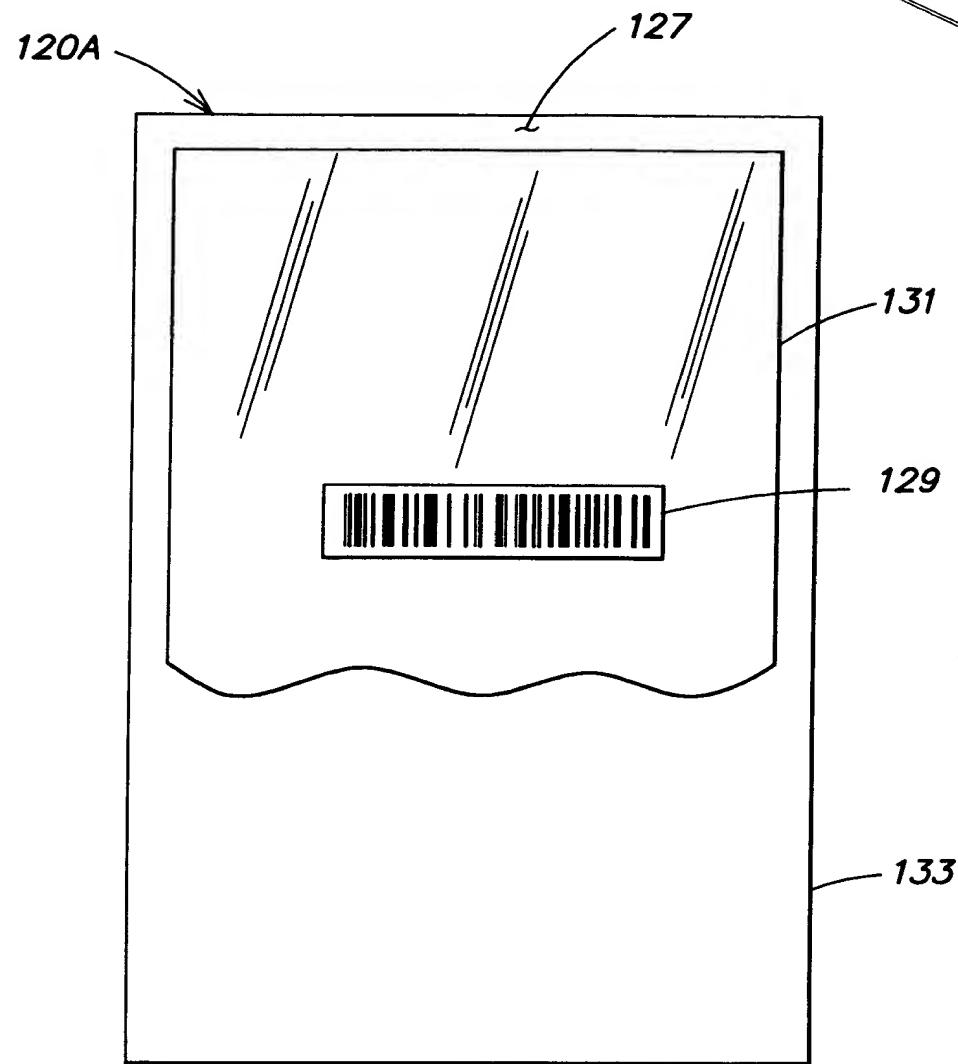


FIG. 10A

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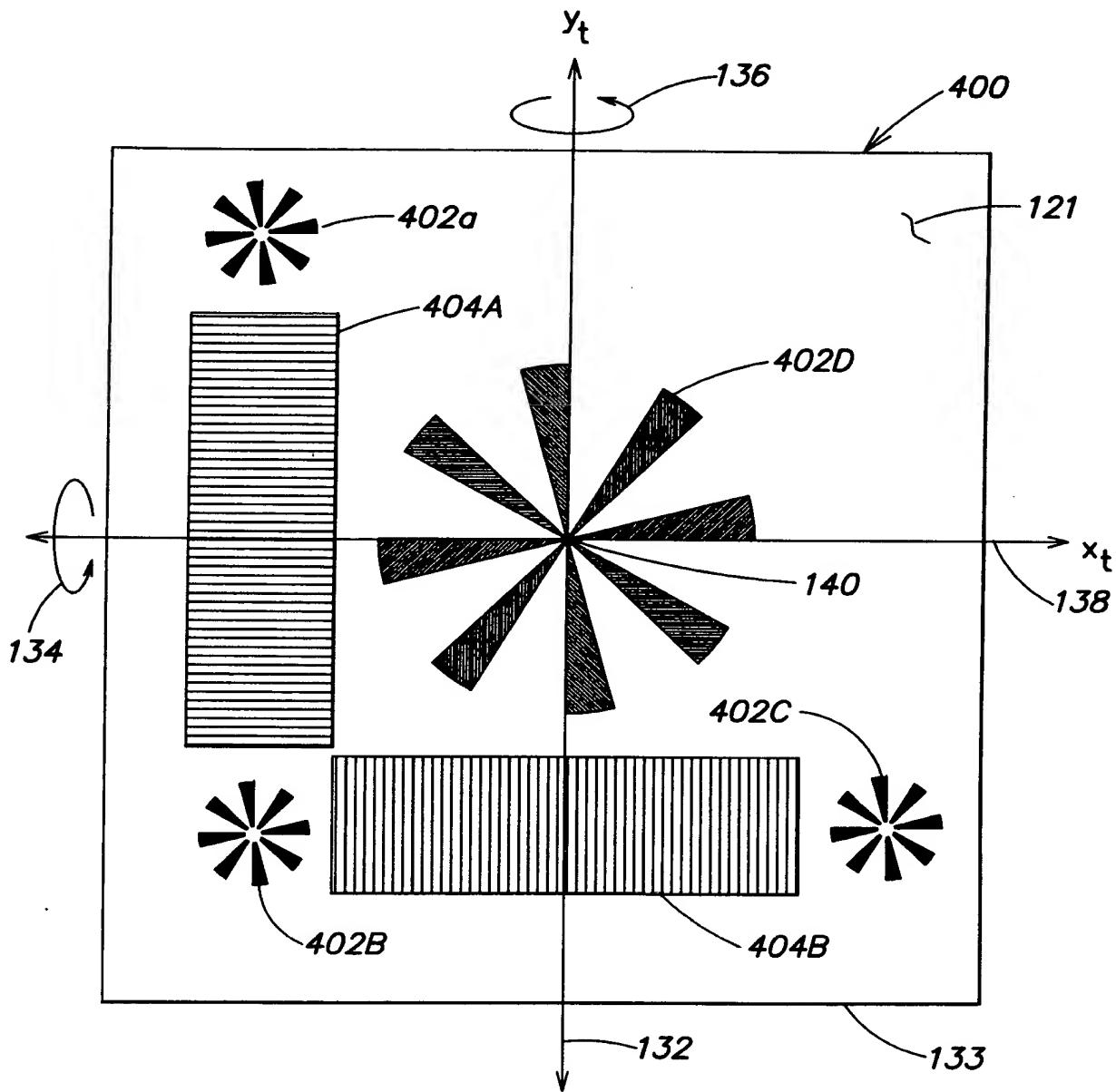


FIG. 10B

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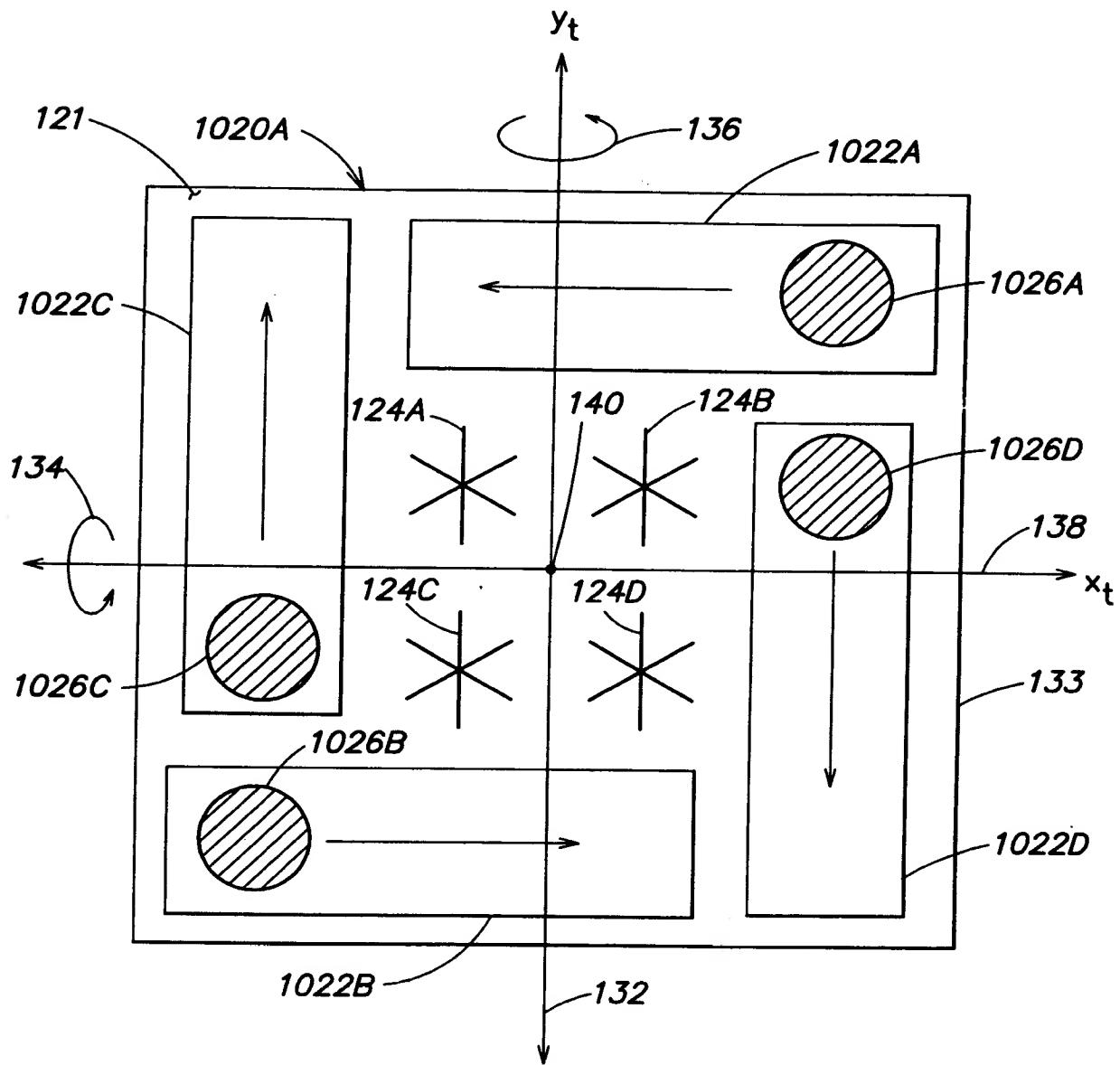


FIG. 10C

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122A

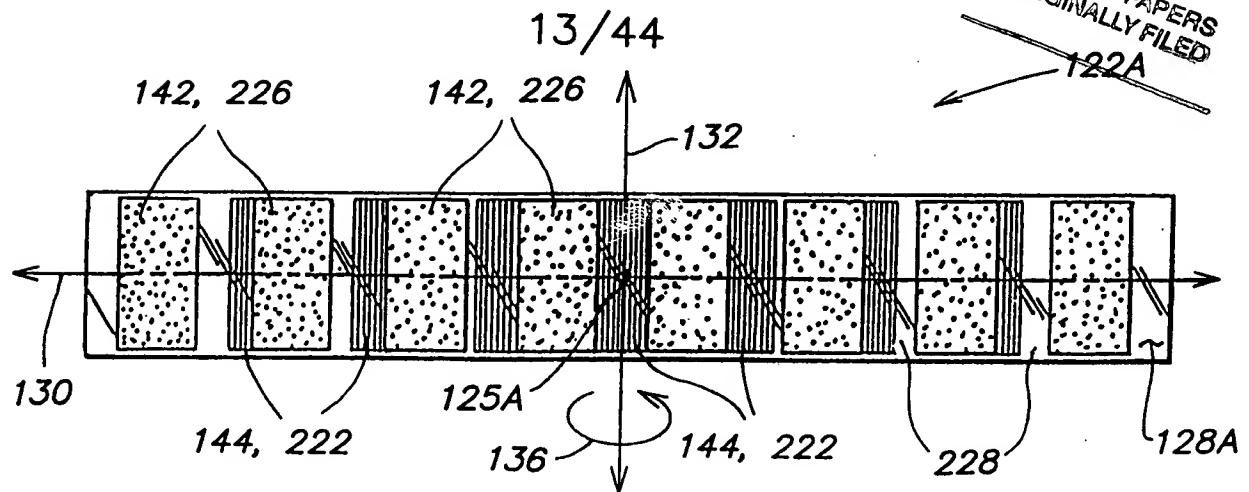


FIG. 11A

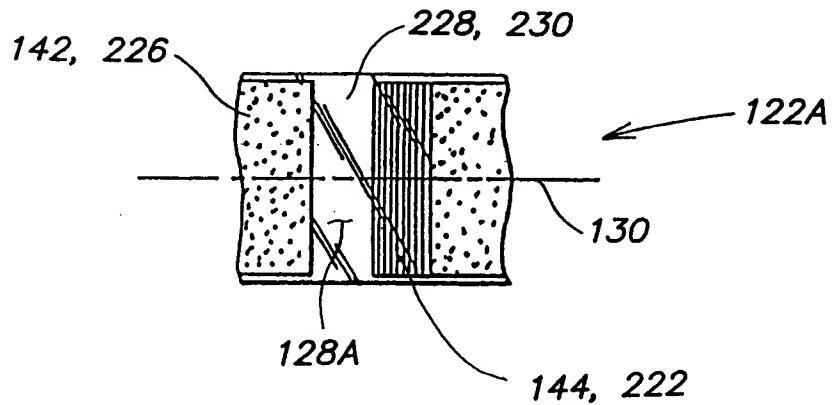


FIG. 11B

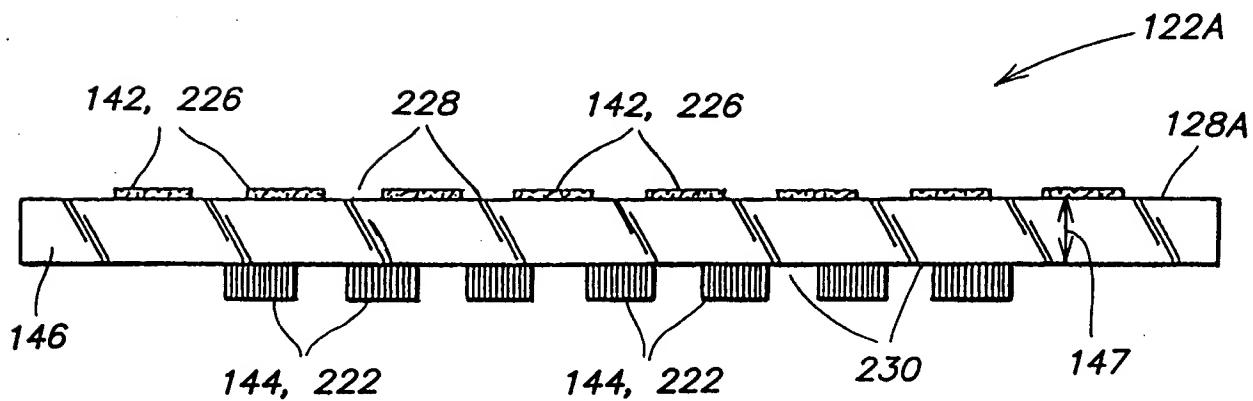


FIG. 11C

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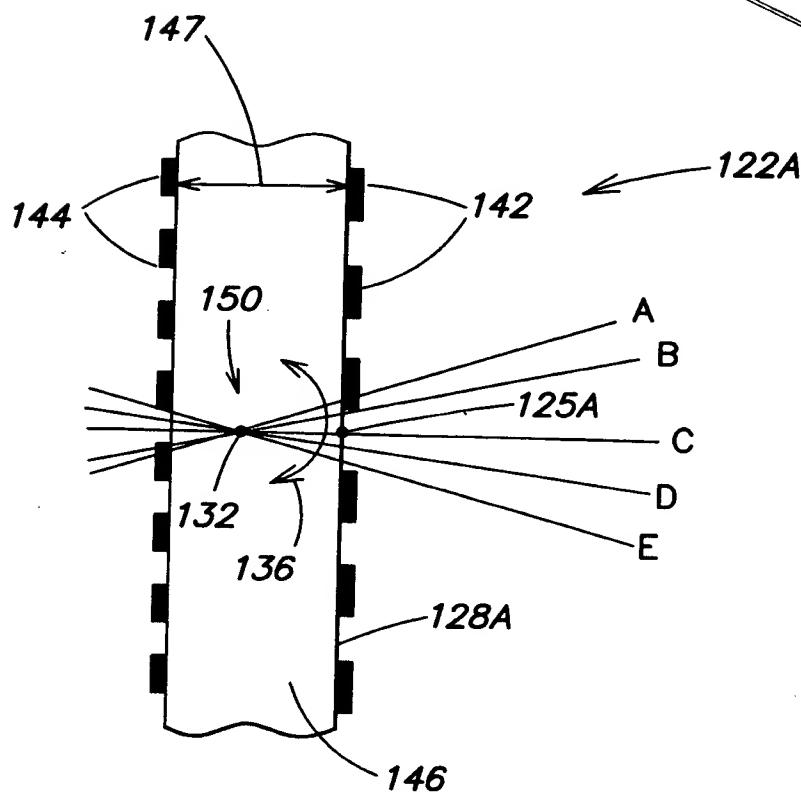


FIG. 12A

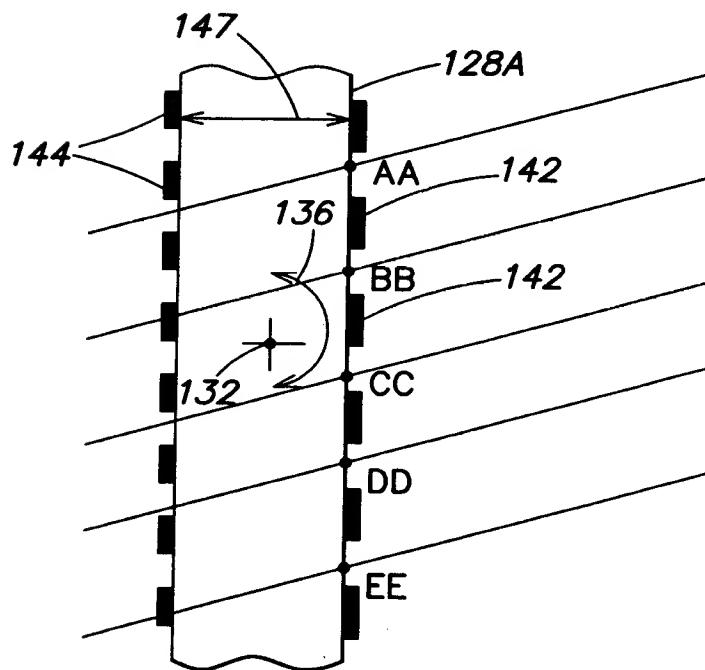


FIG. 12B

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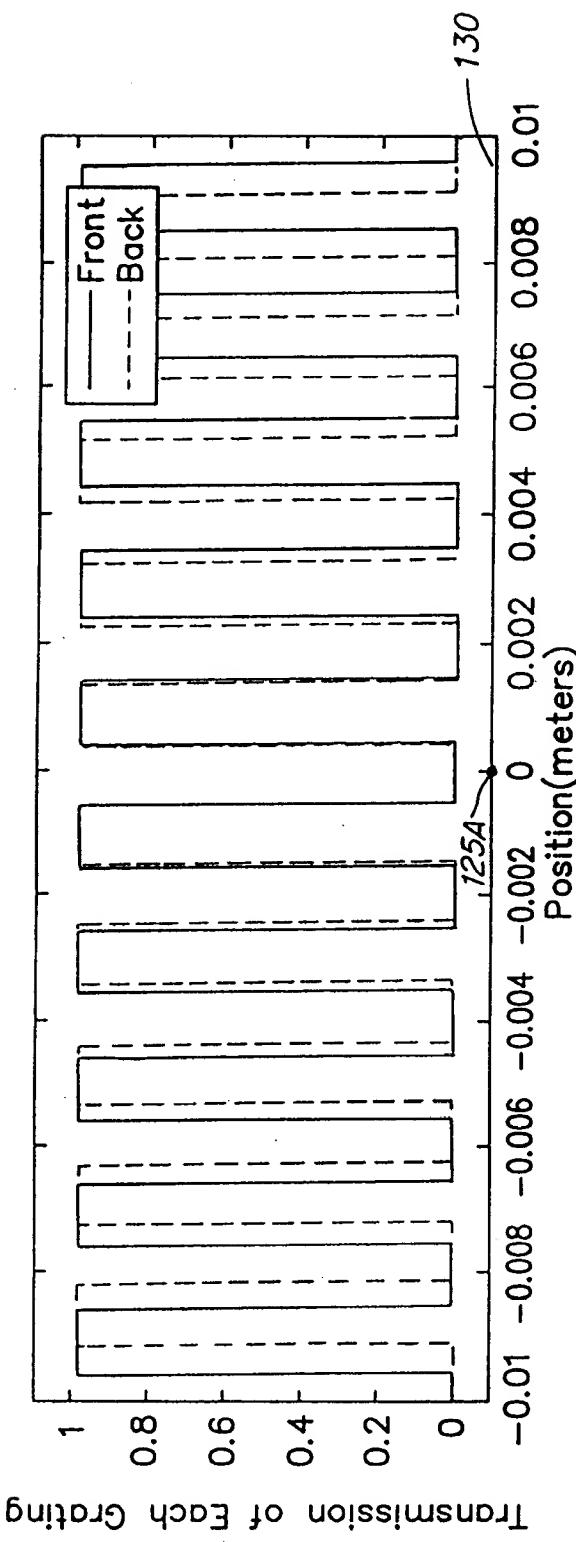


FIG. 13A

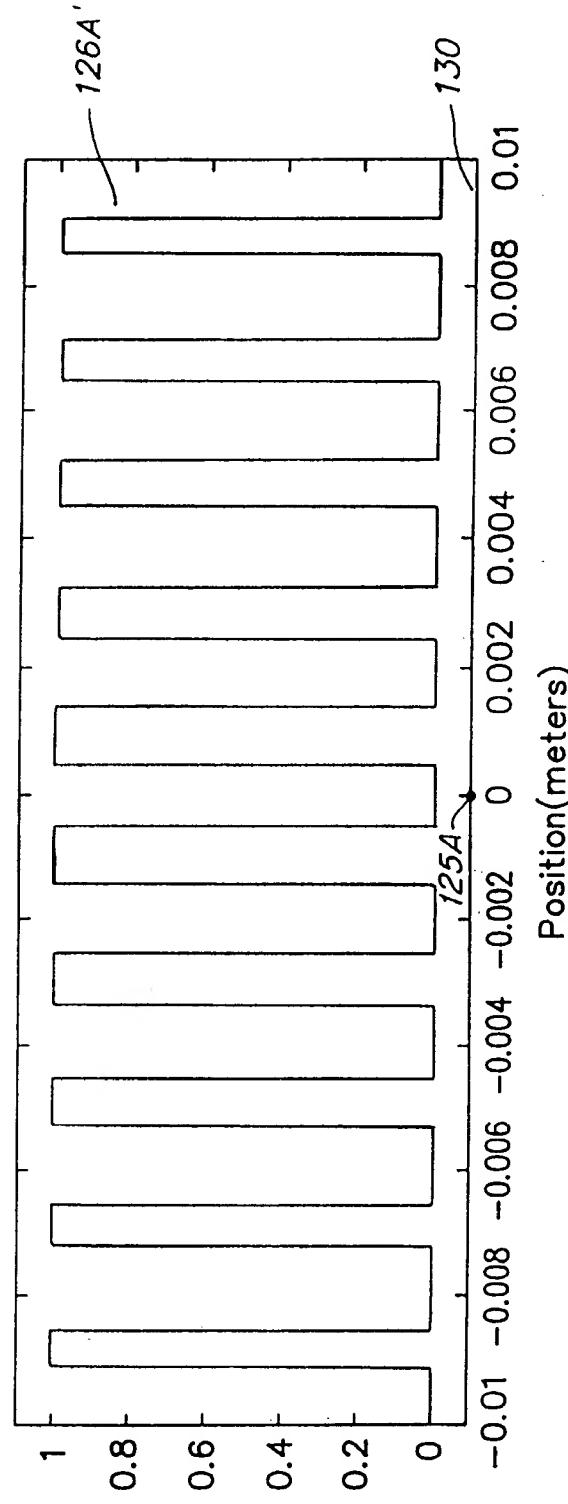
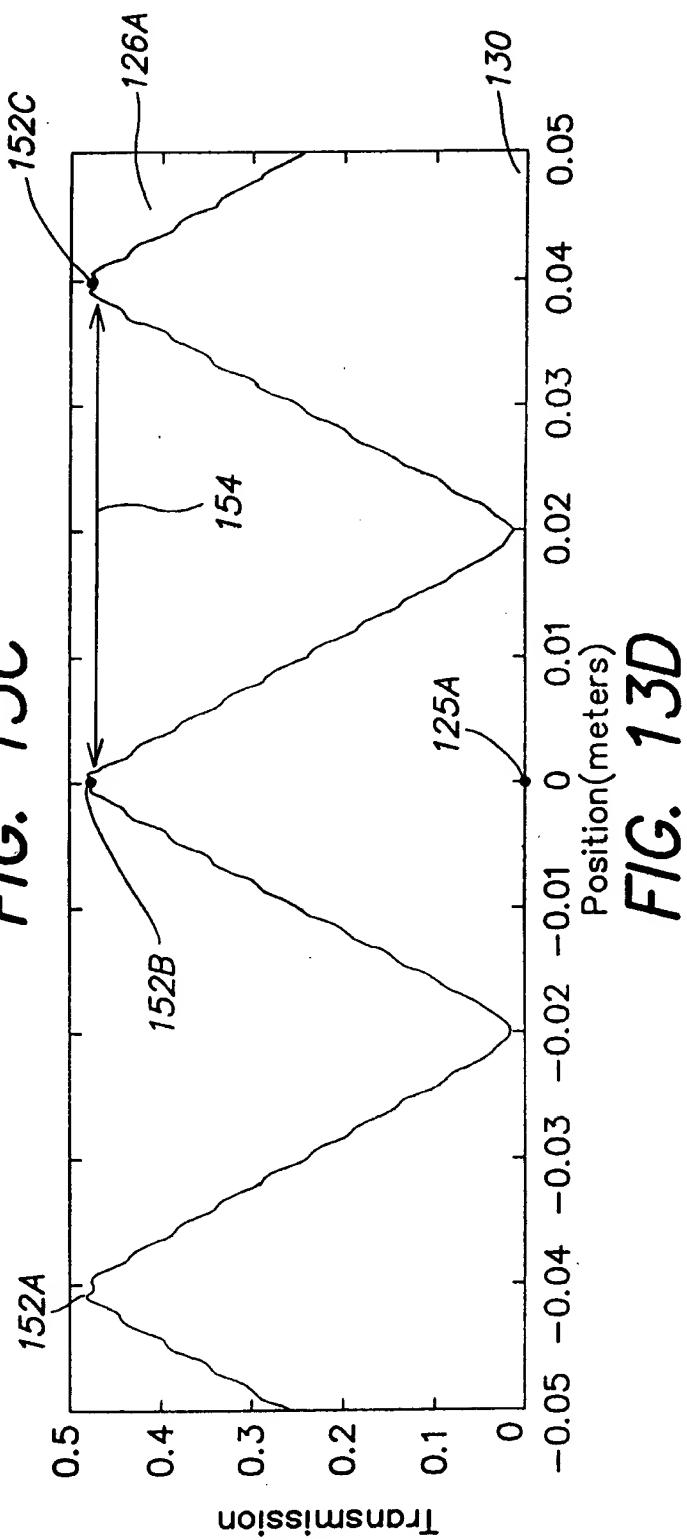
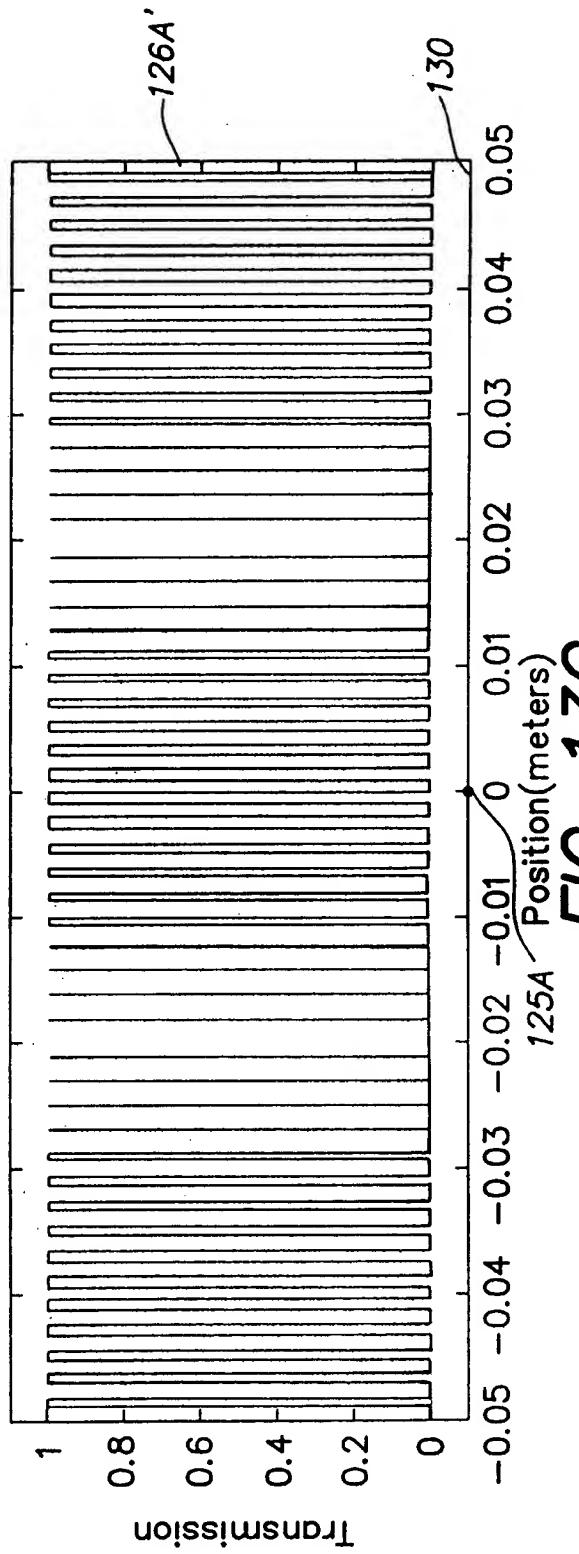


FIG. 13B

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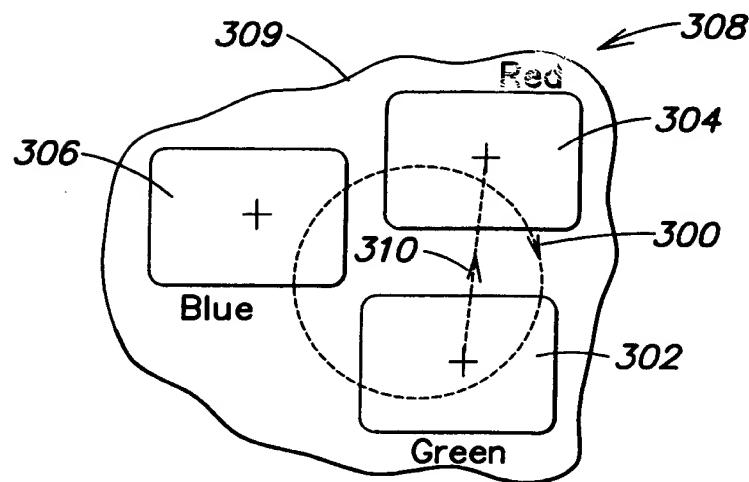


FIG. 14

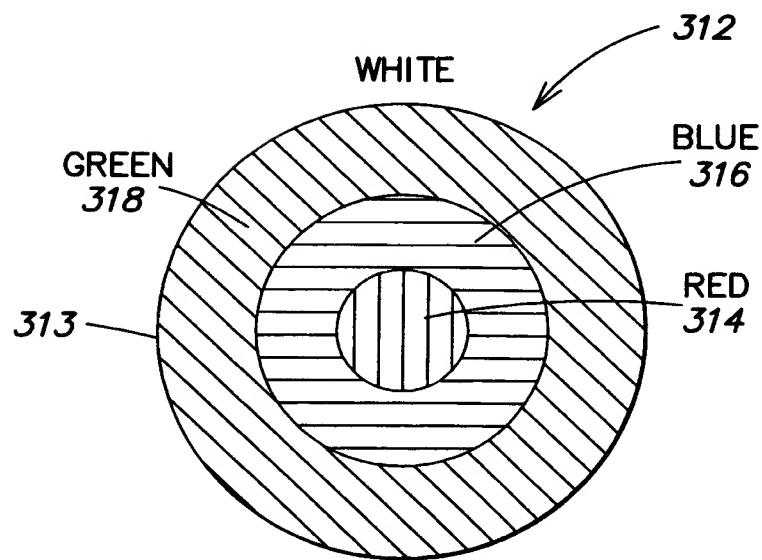


FIG. 15

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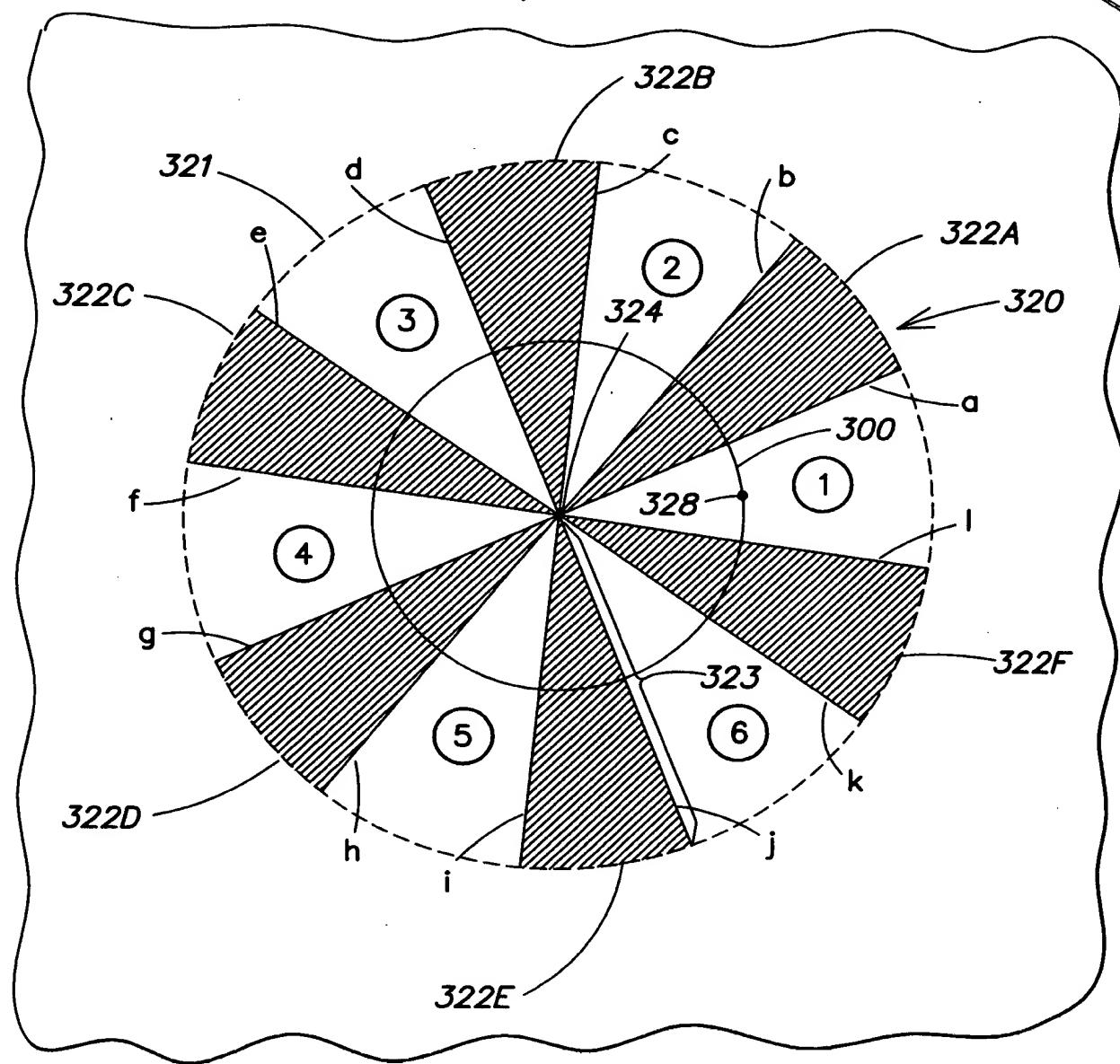


FIG. 16A

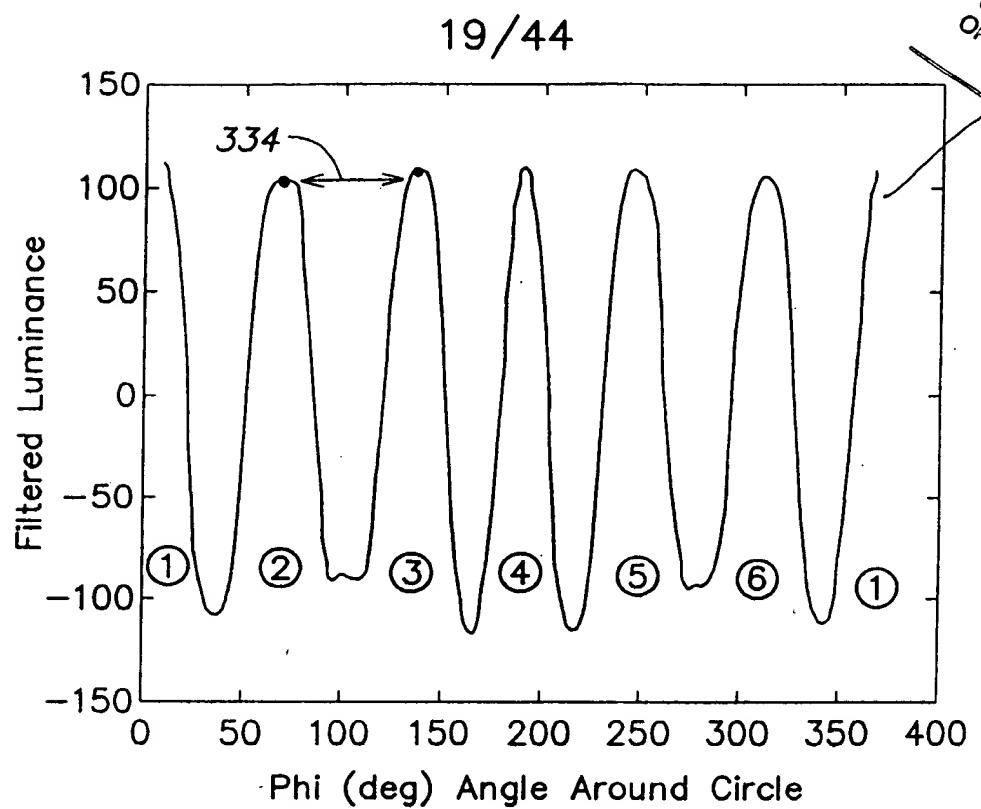


FIG. 16B

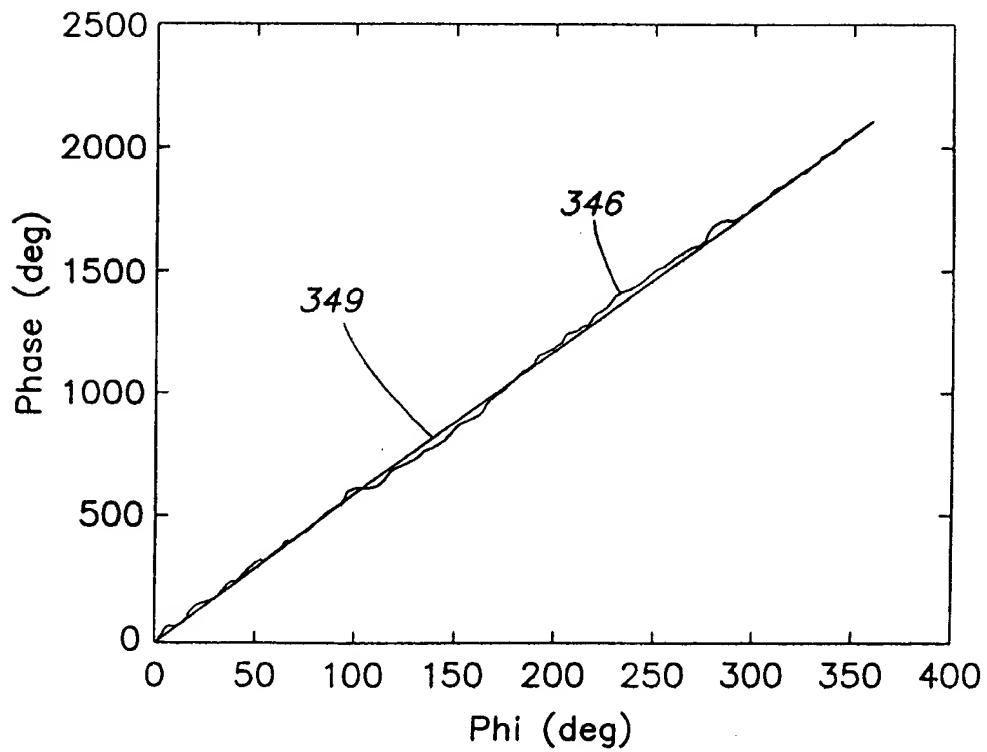


FIG. 16C

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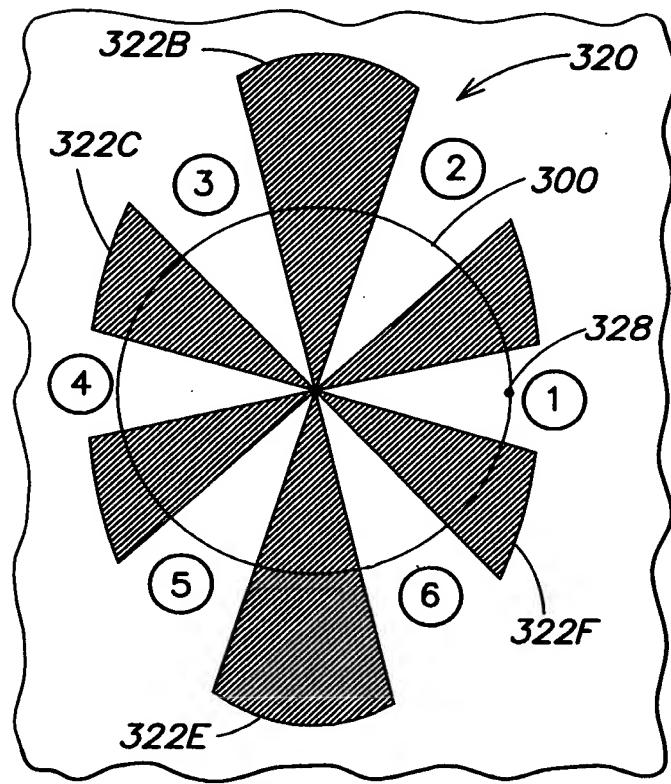


FIG. 17A

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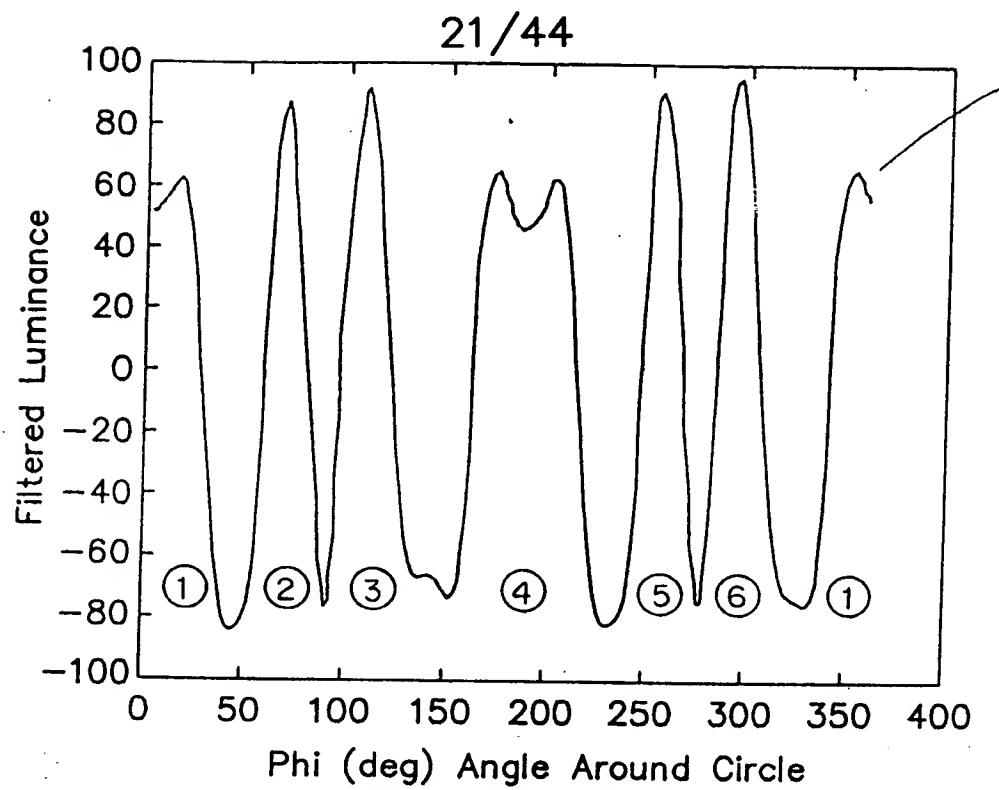


FIG. 17B

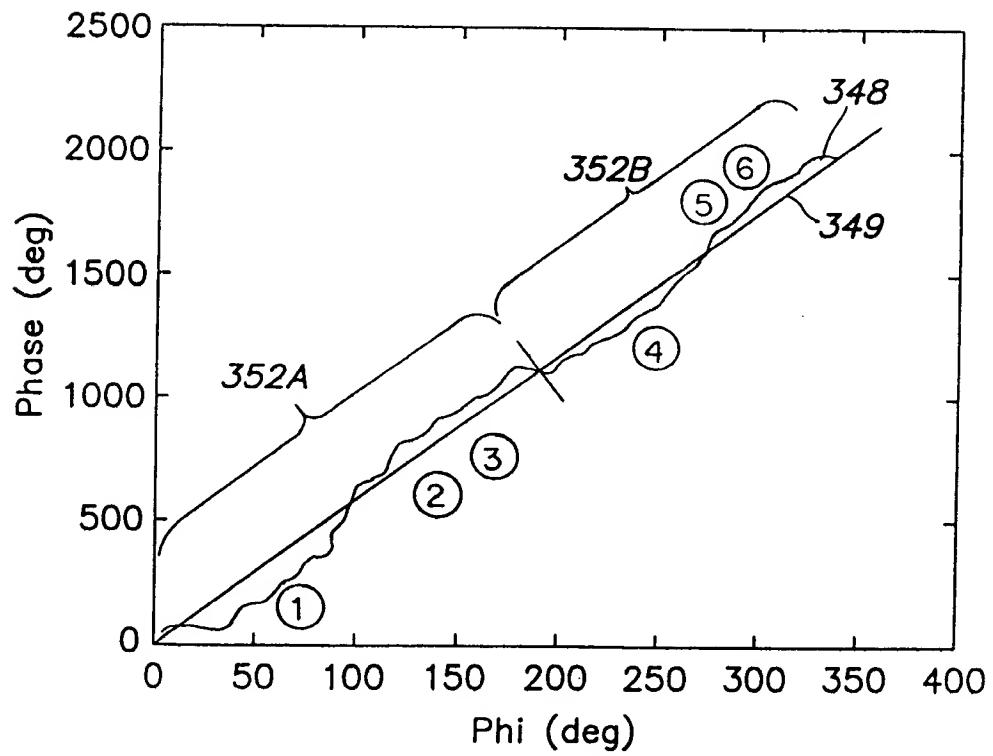


FIG. 17C

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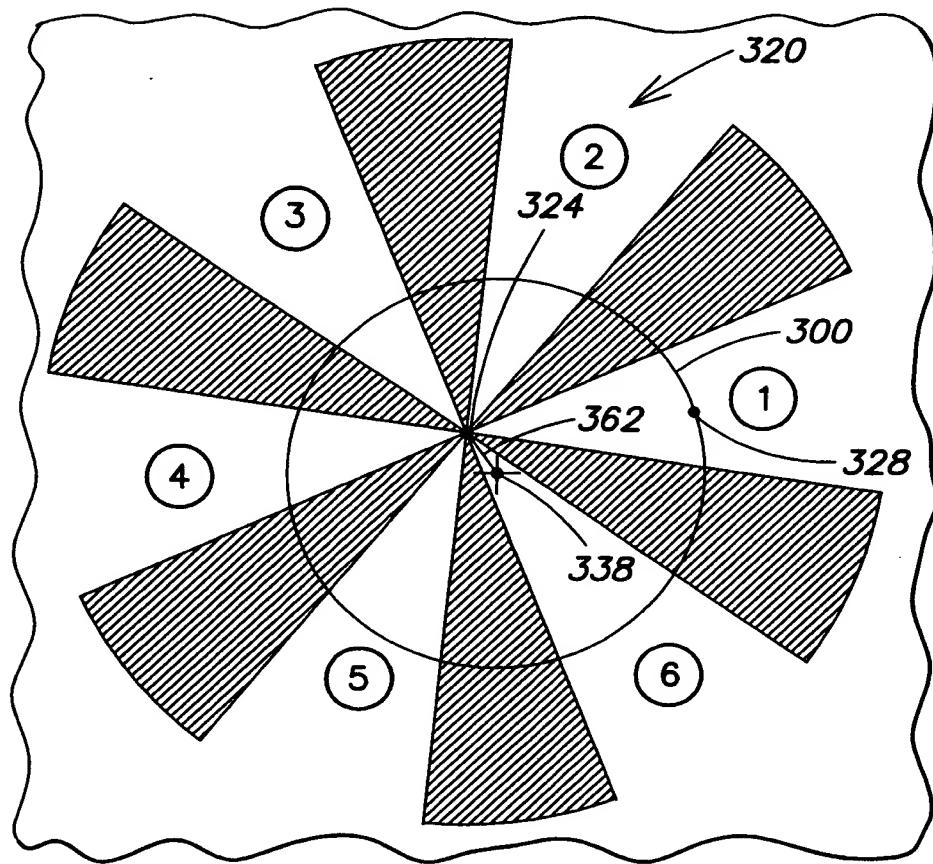


FIG. 18A

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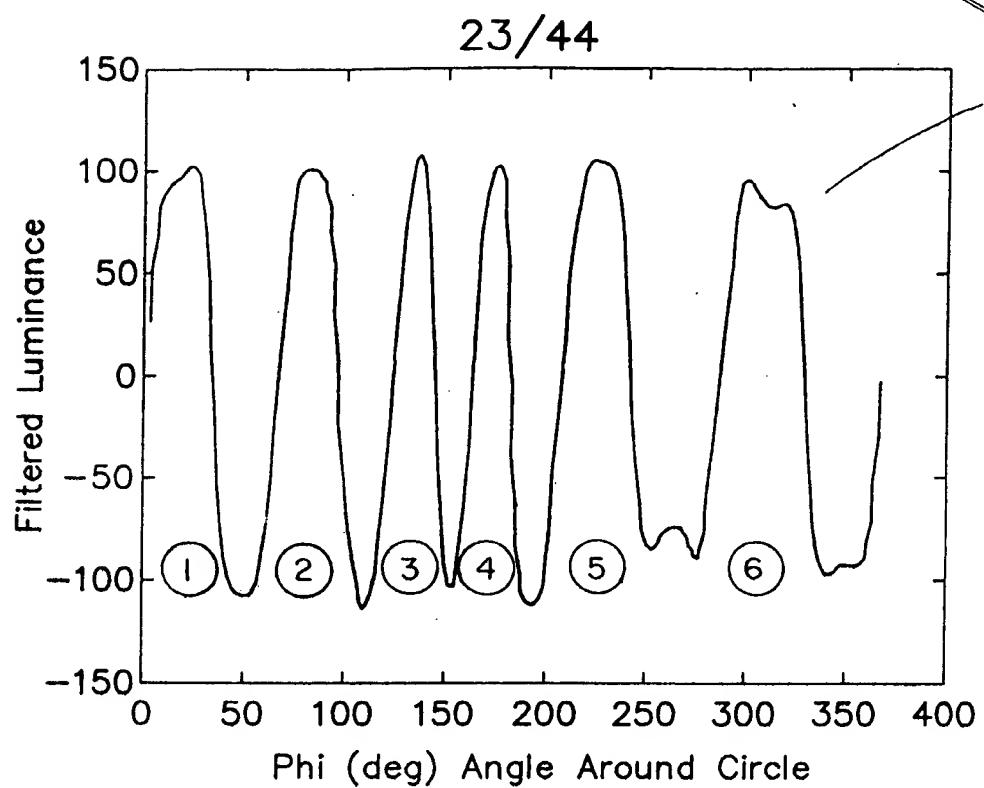


FIG. 18B

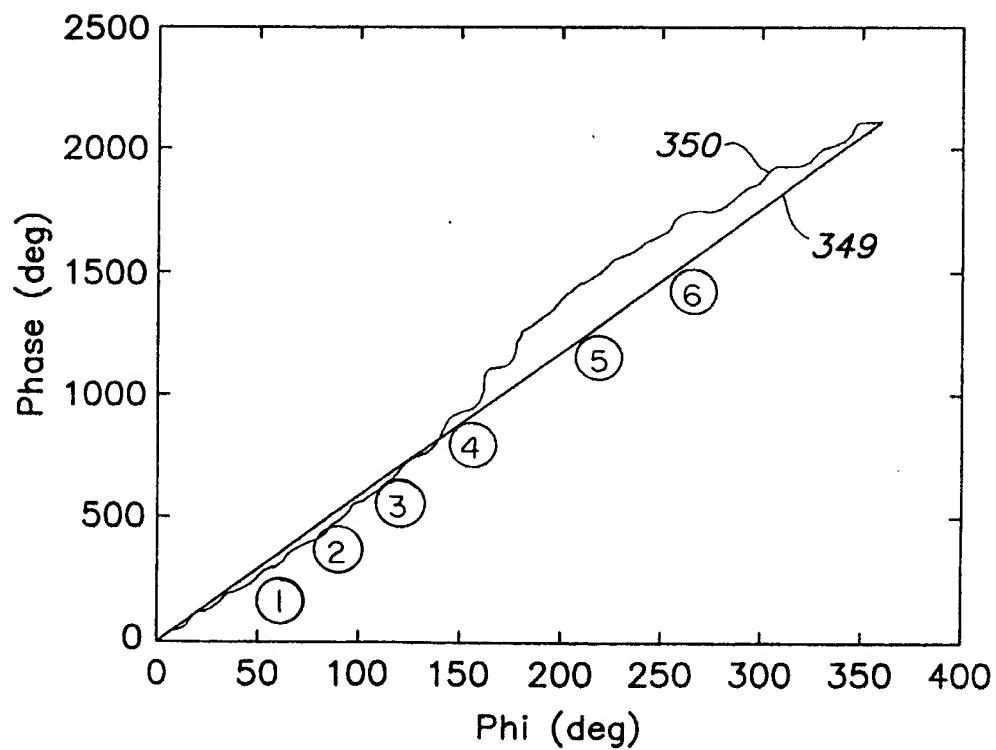


FIG. 18C

COPY OF PAPERS
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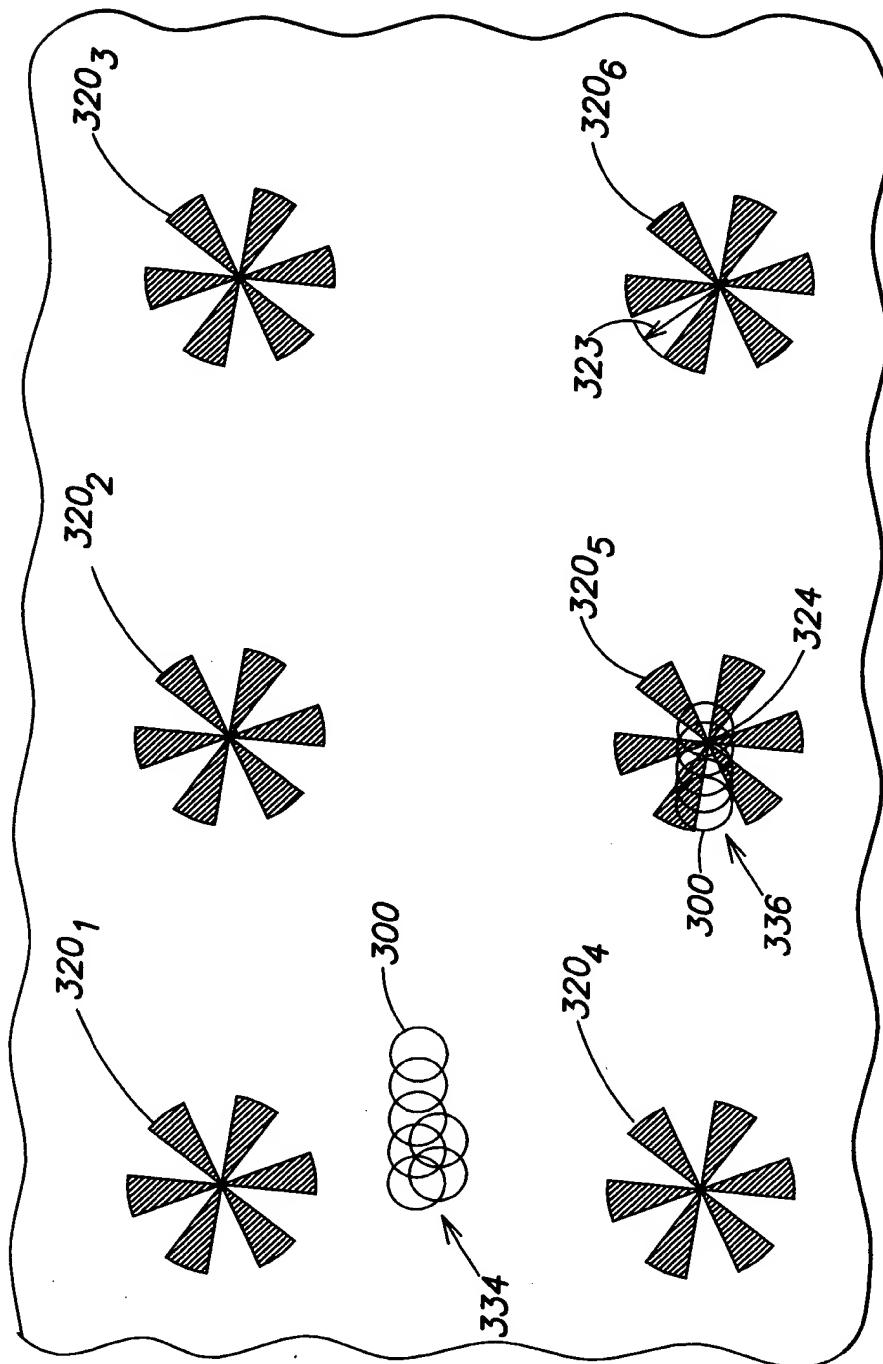


FIG. 19

OPY OF PAPERS
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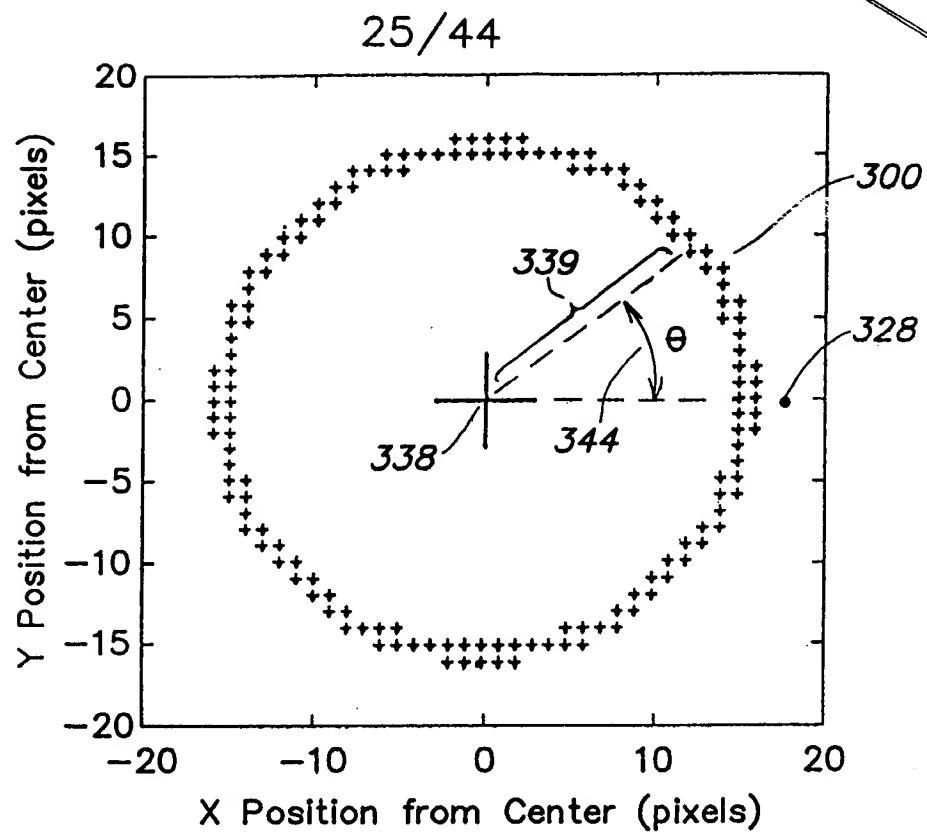


FIG. 20

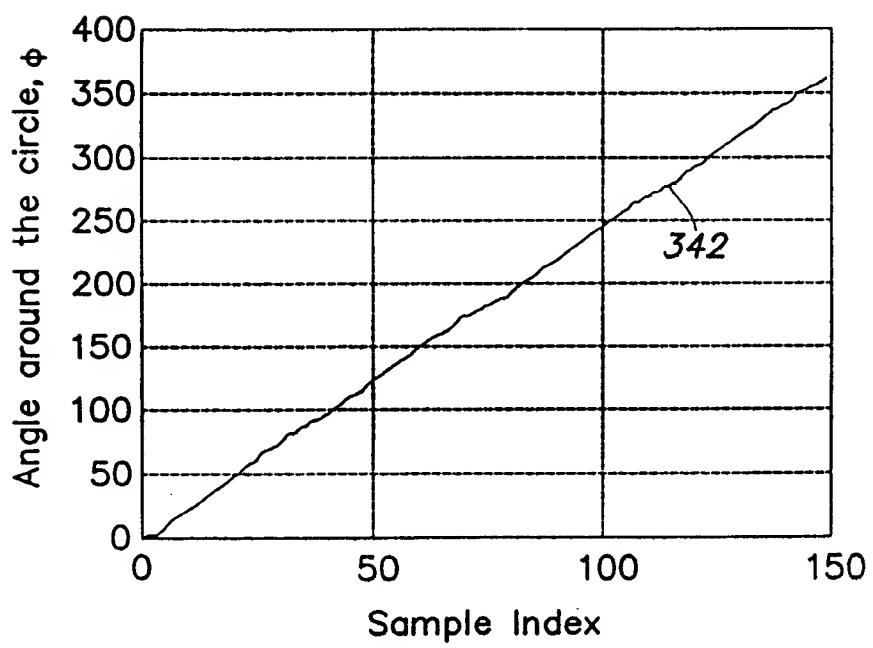


FIG. 21

COPY OF PAPERS
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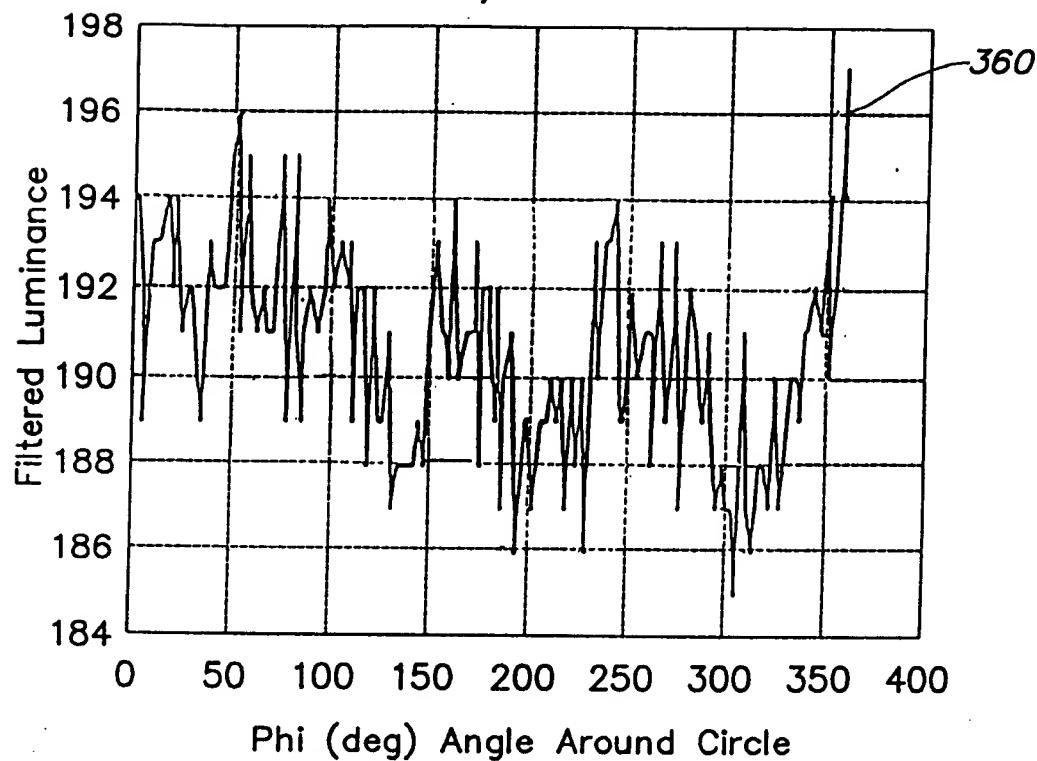


FIG. 22A

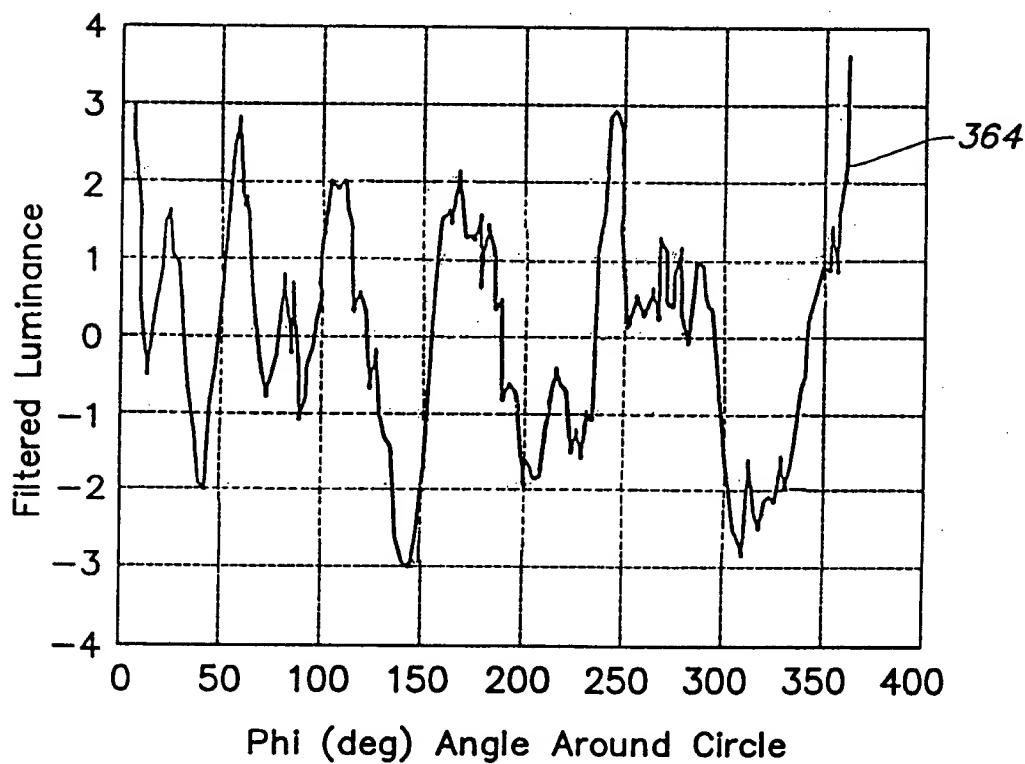


FIG. 22B

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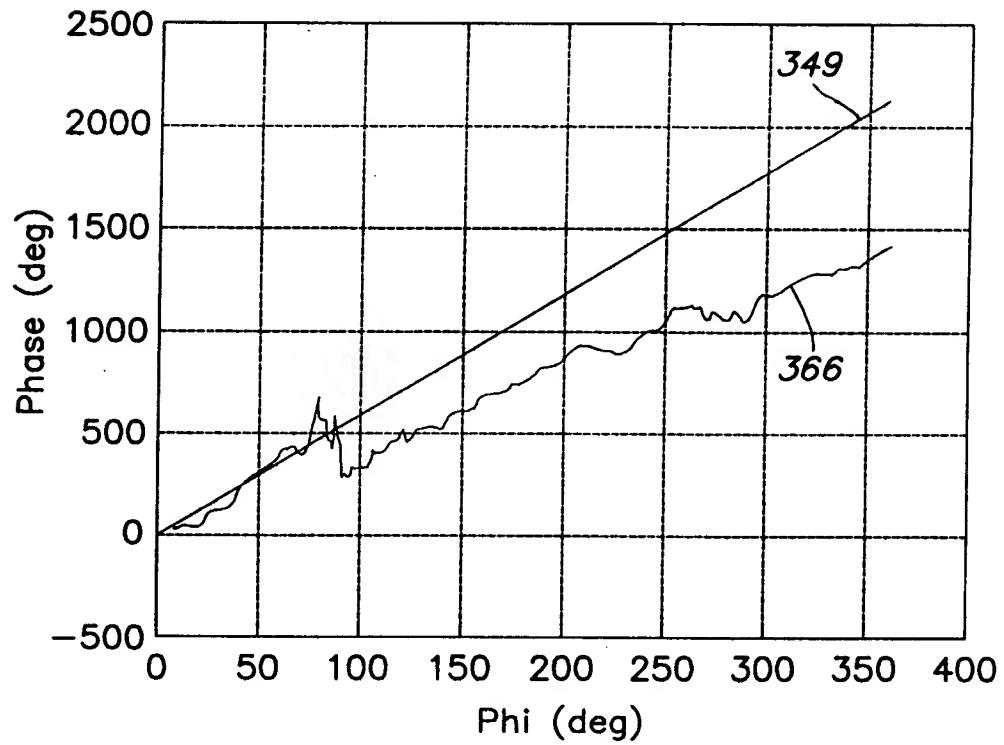


FIG. 22C

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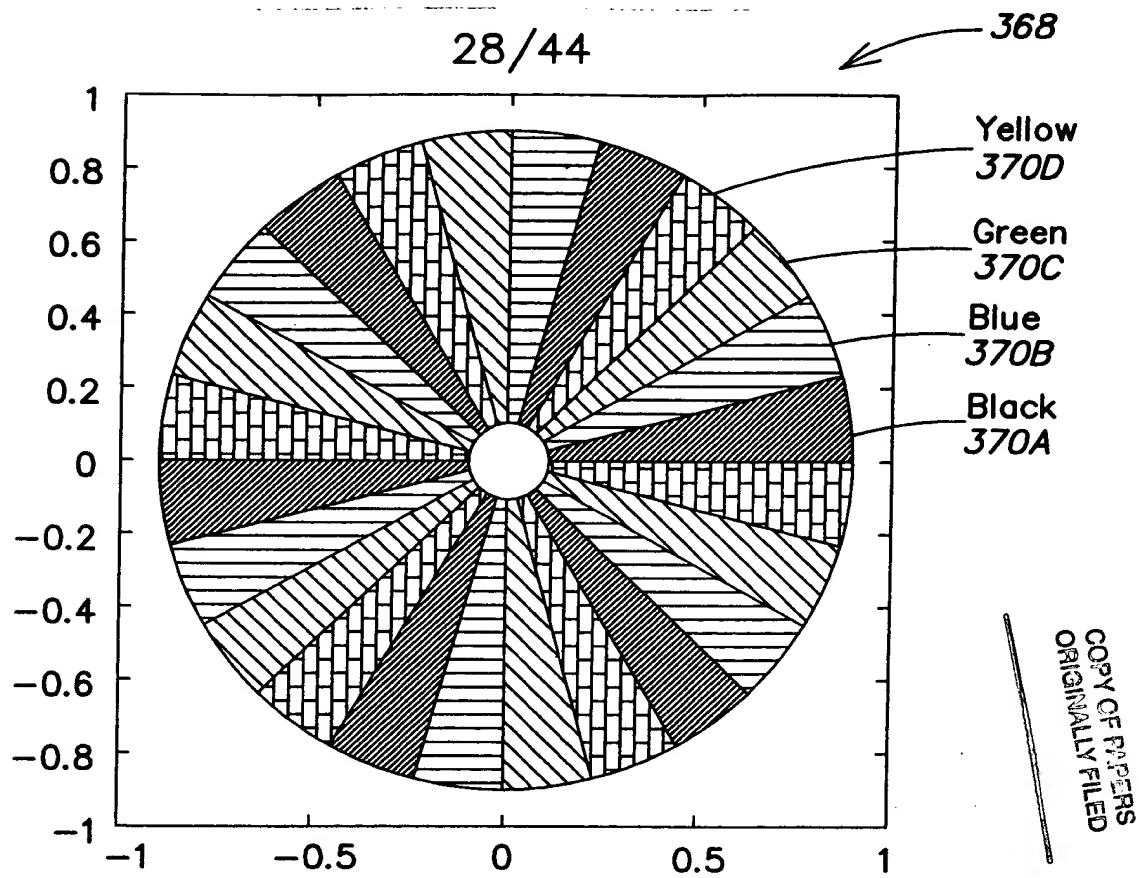


FIG. 23A

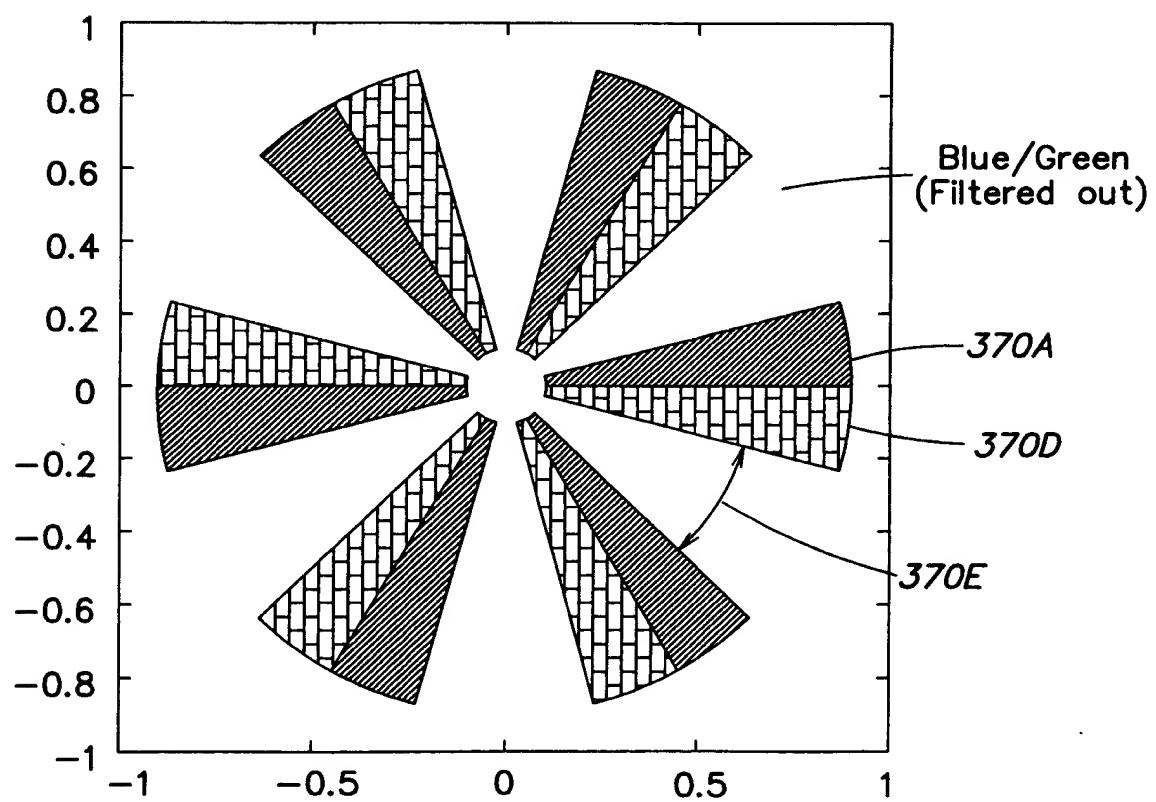


FIG. 23B

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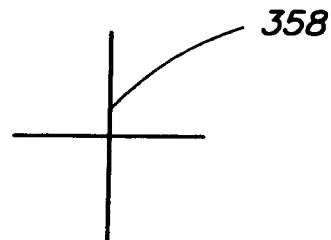


FIG. 24A

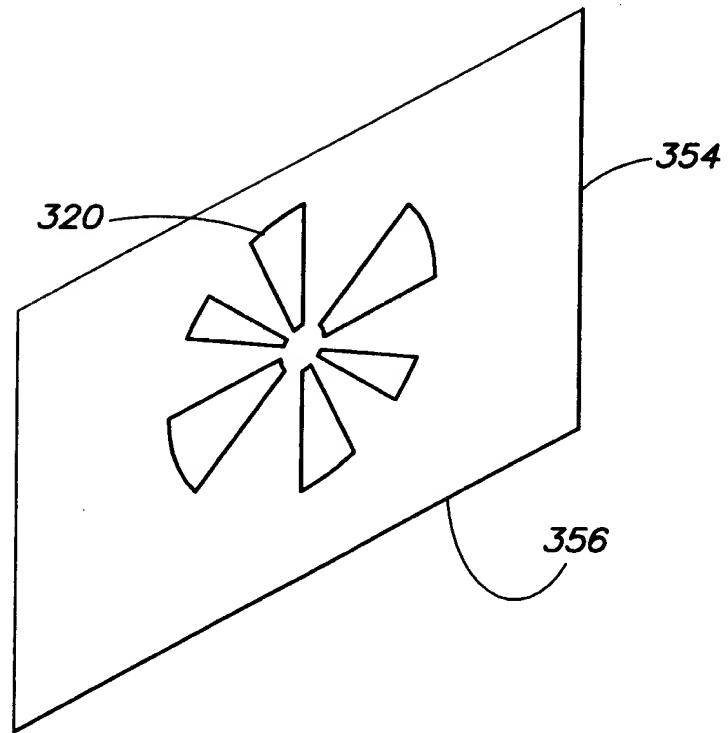


FIG. 24B

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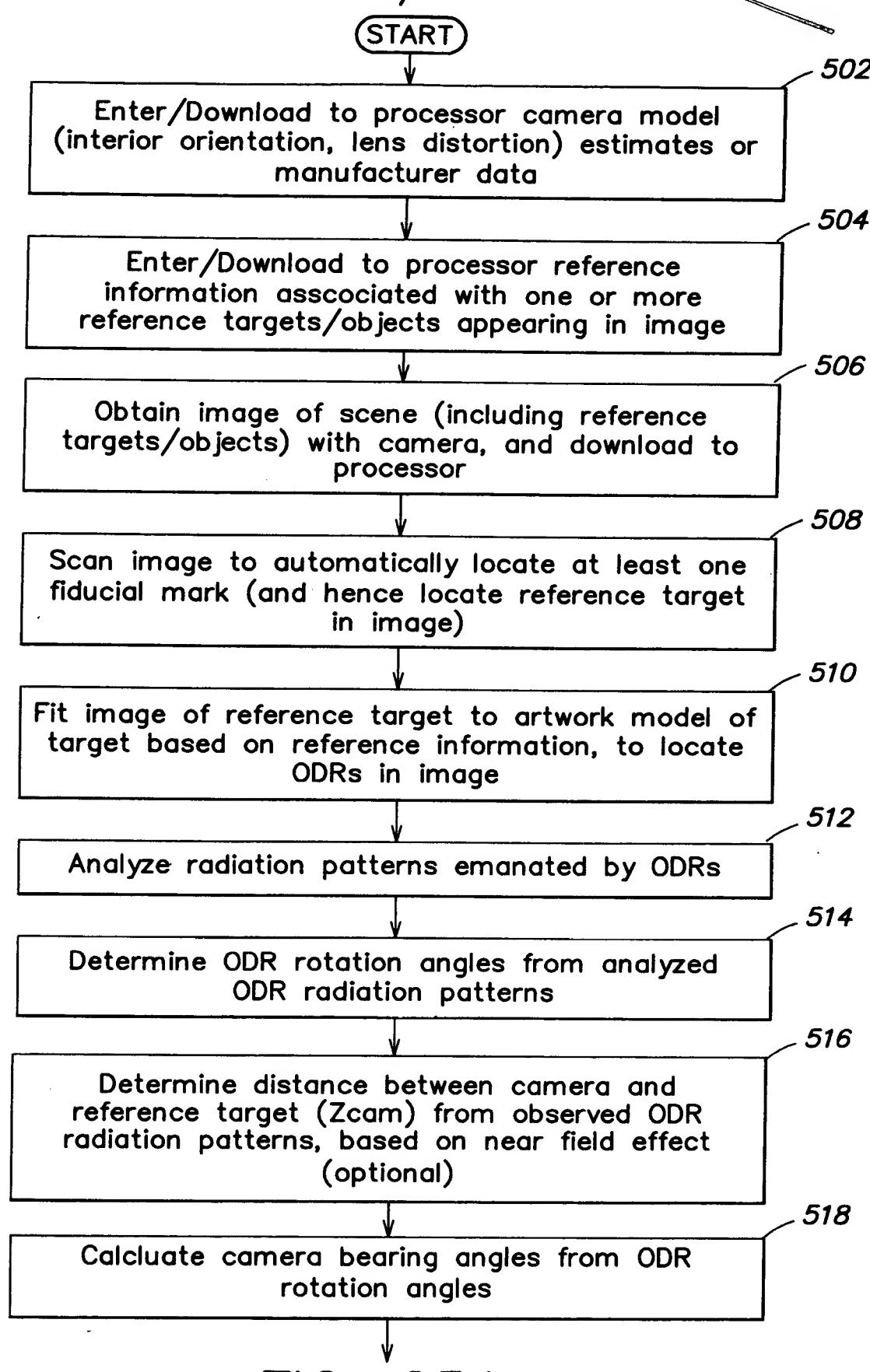


FIG. 25A

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520

Determine an initial estimate of camera exterior orientation based on calculated camera bearing angles, camera model estimates (interior orientation), and reference information associated with at least two fiducial marks (e.g., using a system of modified collinearity equations)

522

Refine estimates of camera calibration information (e.g., interior and exterior orientation, and lens distortion parameters) by least-squares iteration using one or more of initial estimation of exterior orientation, camera model estimates, reference information, and distance Zcam between camera and target, to obtain coordinate transformation from camera image plane to reference coordinate system for scene

524

Manually or automatically identify points/objects of interest in the scene from the image of the scene, for which position/size information is desired

Do Points/Objects of
interest lie in the
reference target
plane?

No

Yes

Enter/Download to processor
relationship/transformation
between reference plane and
measurement plane in which
points/objects of interest lie

528

Apply appropriate
transformation to identified
points/objects of interest to
obtain actual position/size
information in scene

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END

FIG. 25B

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COPY OF PAPERS
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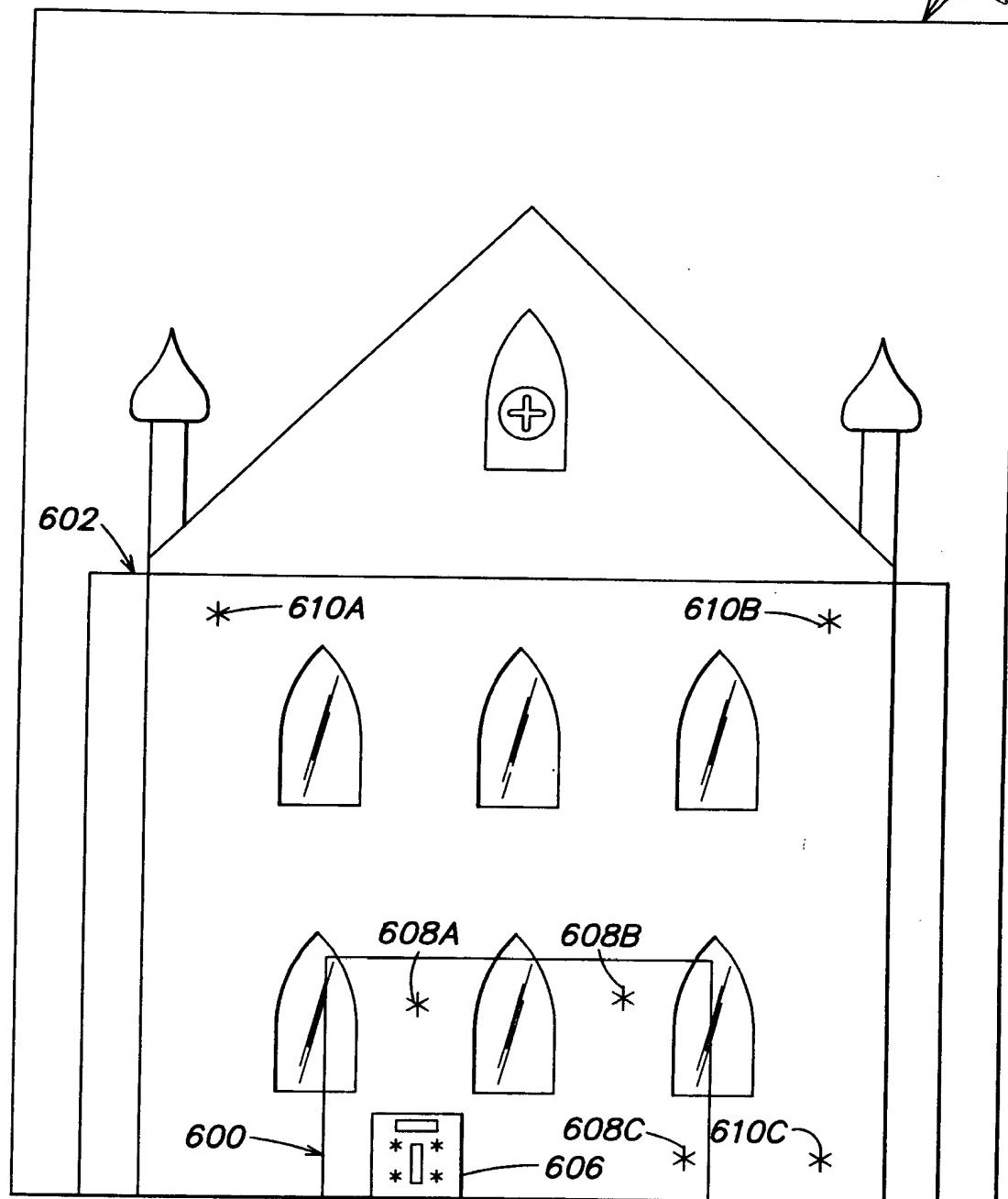


FIG. 26

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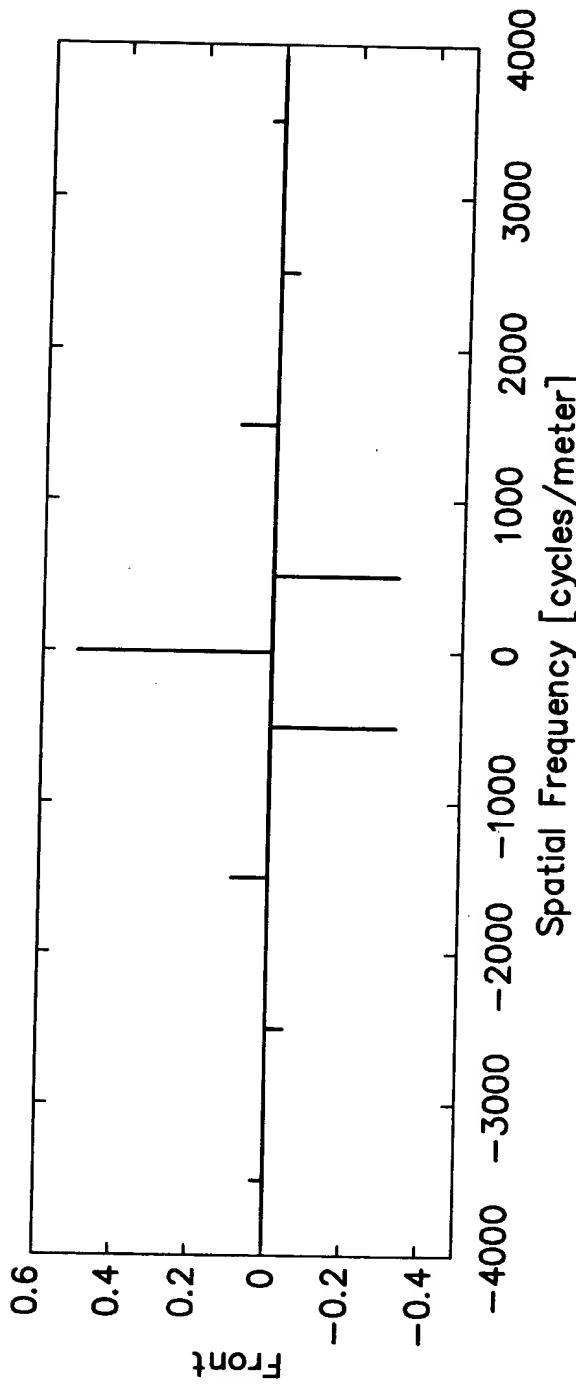


FIG. 27

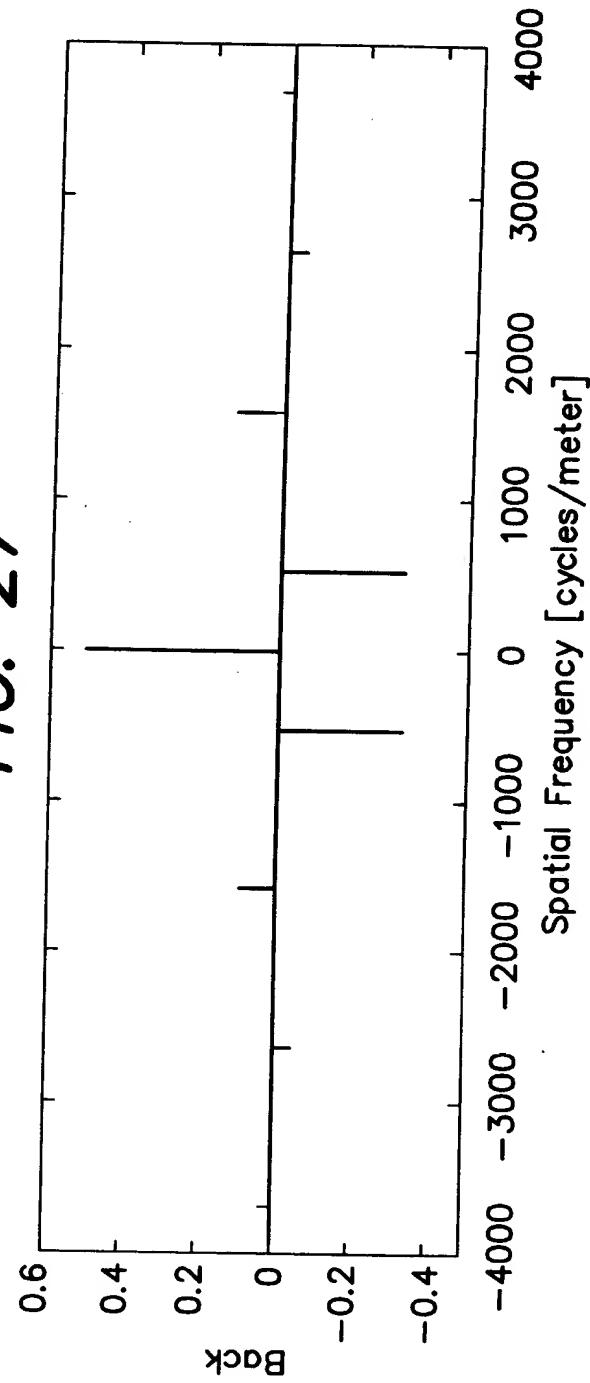


FIG. 28

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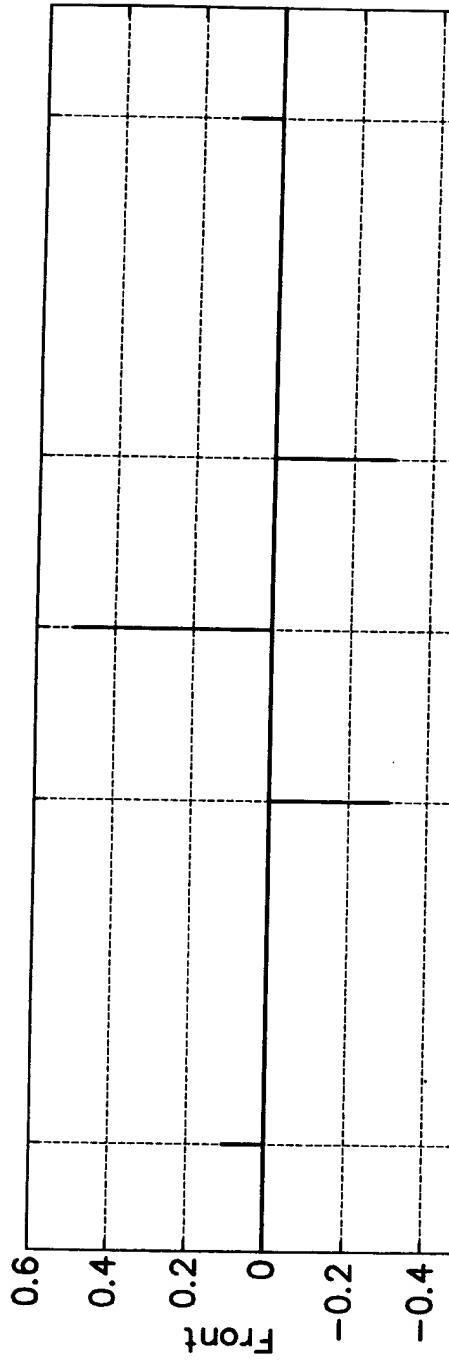


FIG. 29

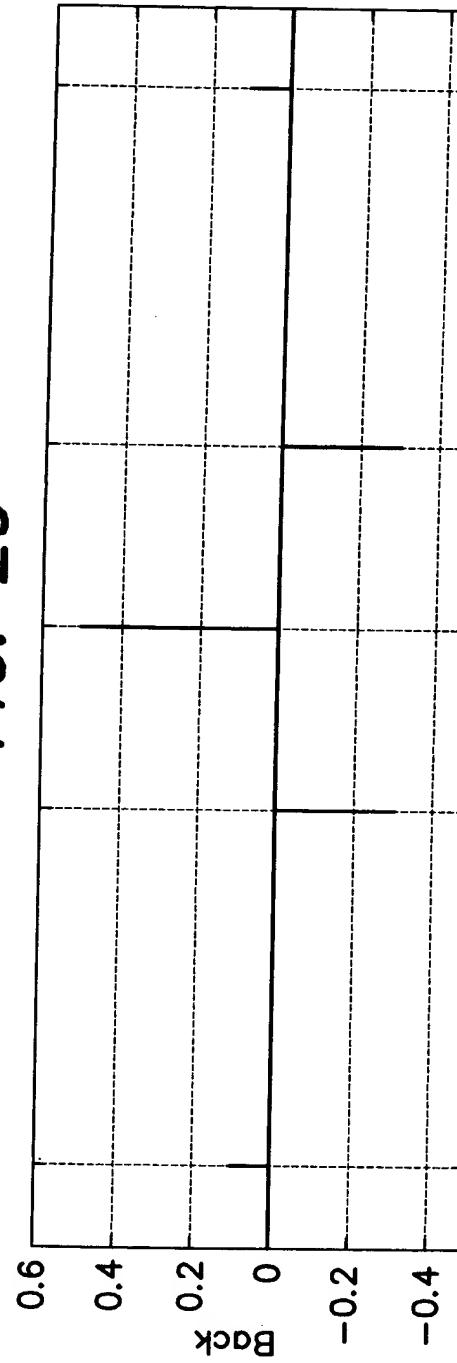


FIG. 30

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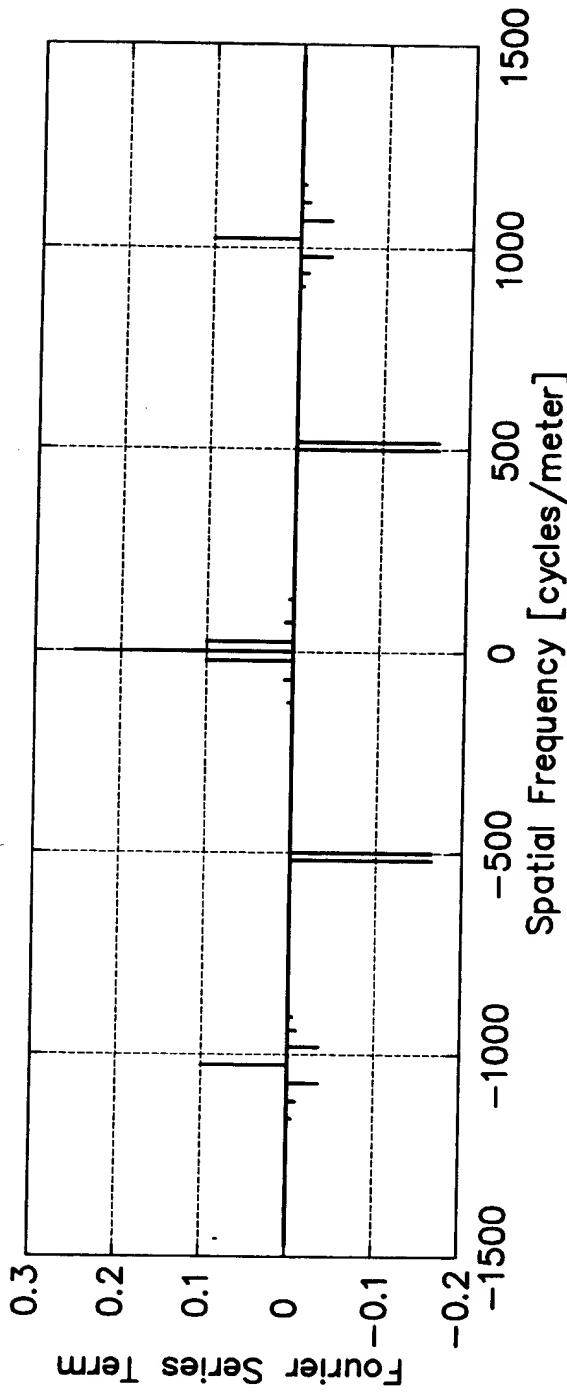


FIG. 31

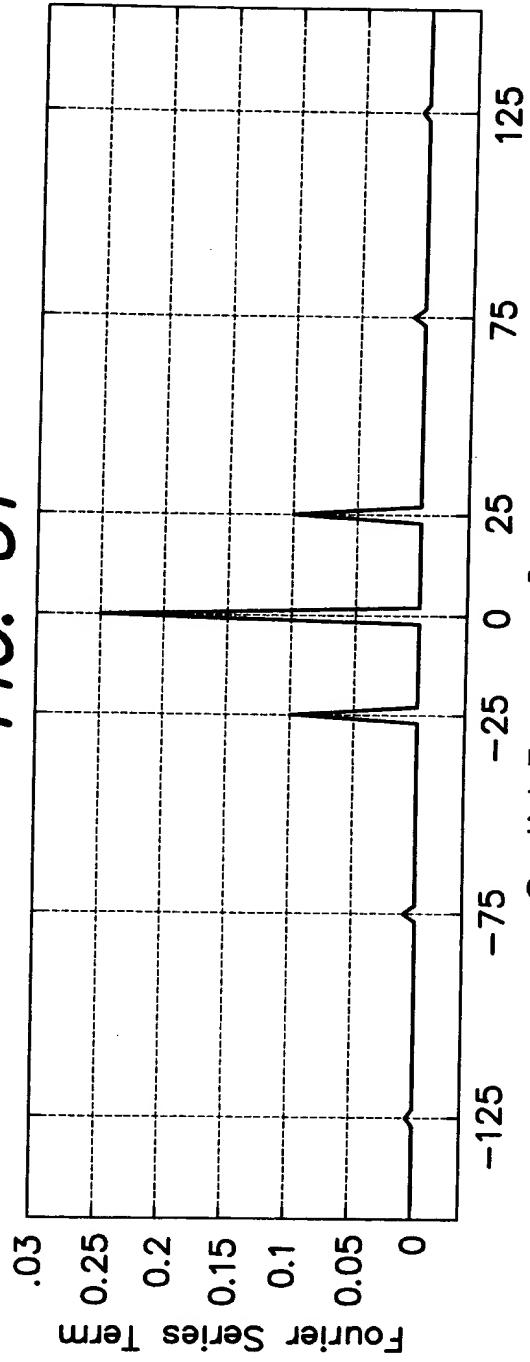


FIG. 32

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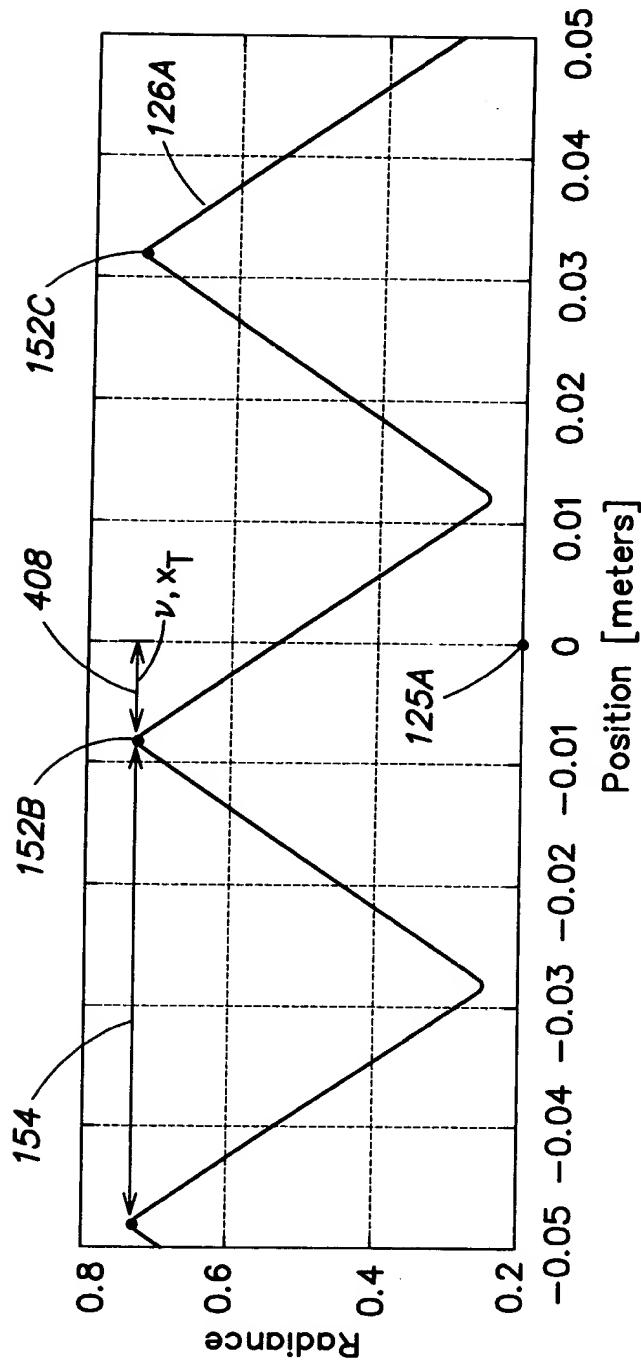


FIG. 33

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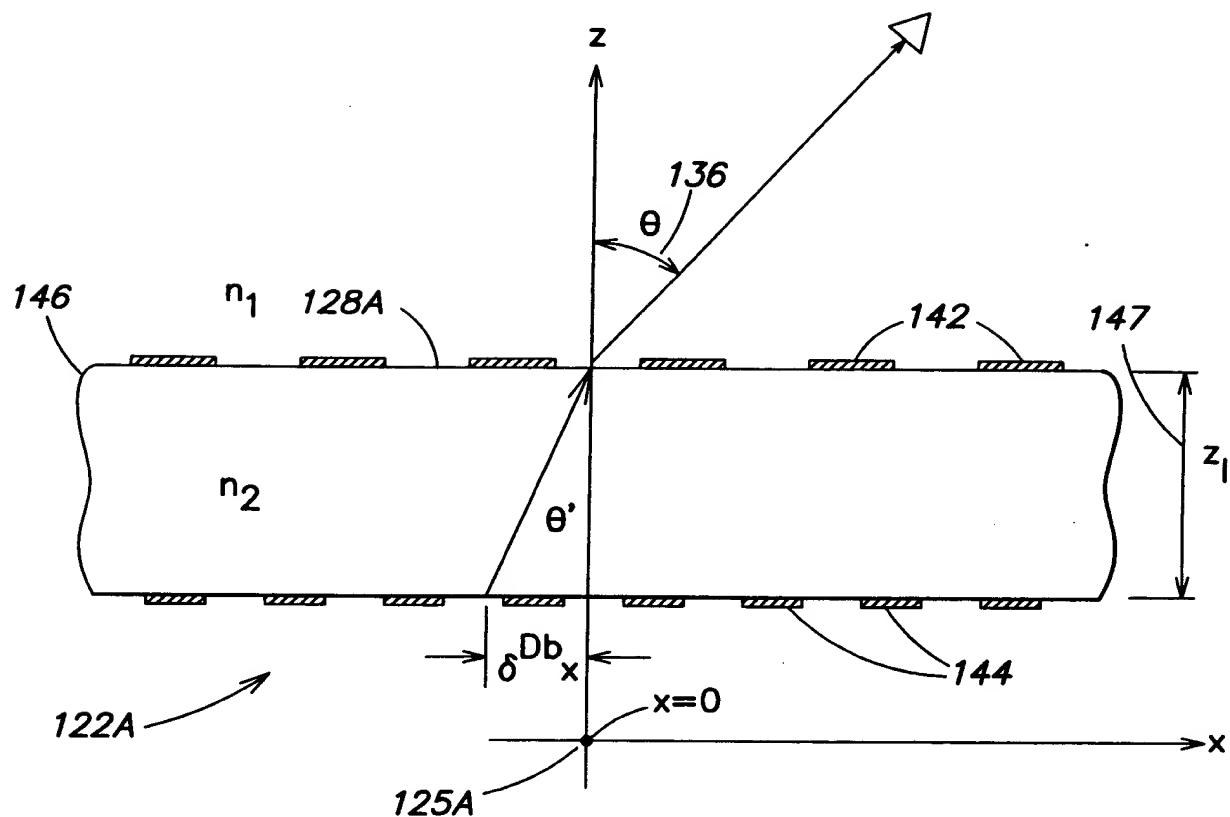


FIG. 34

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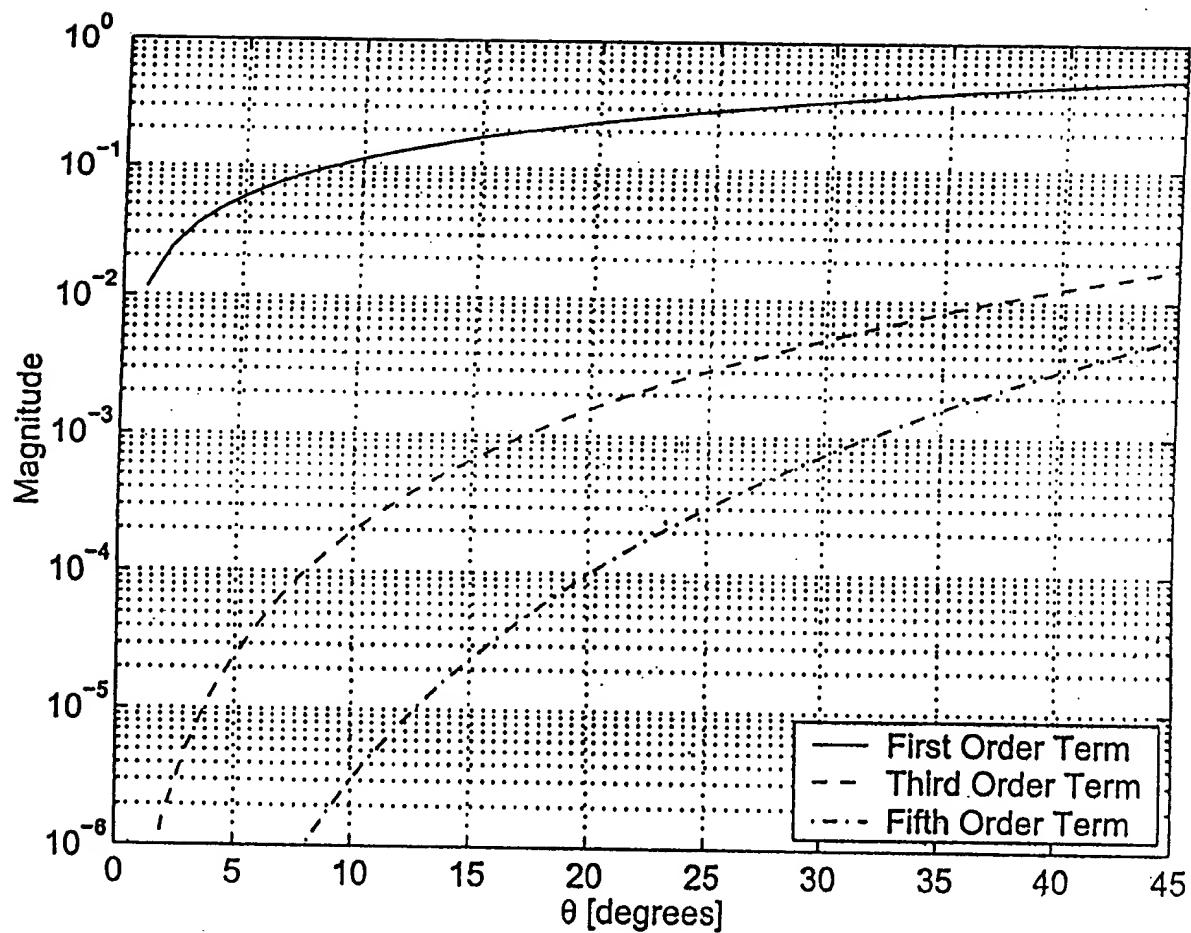


FIG. 35

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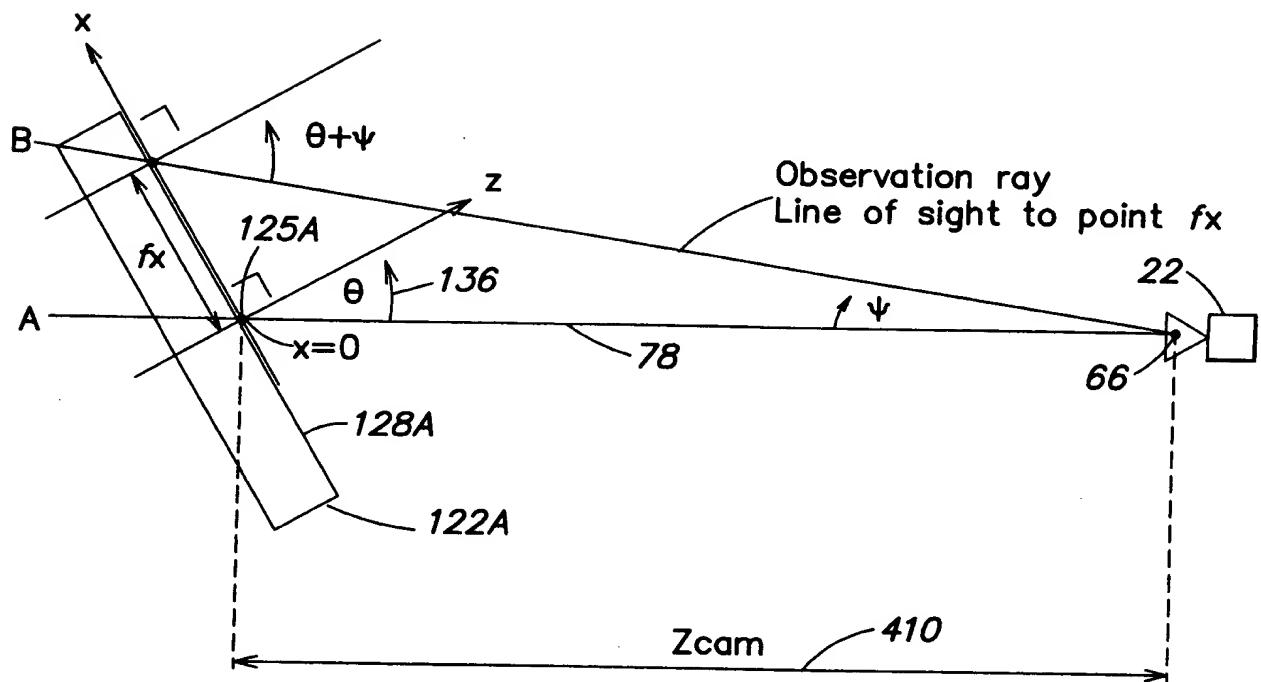


FIG. 36

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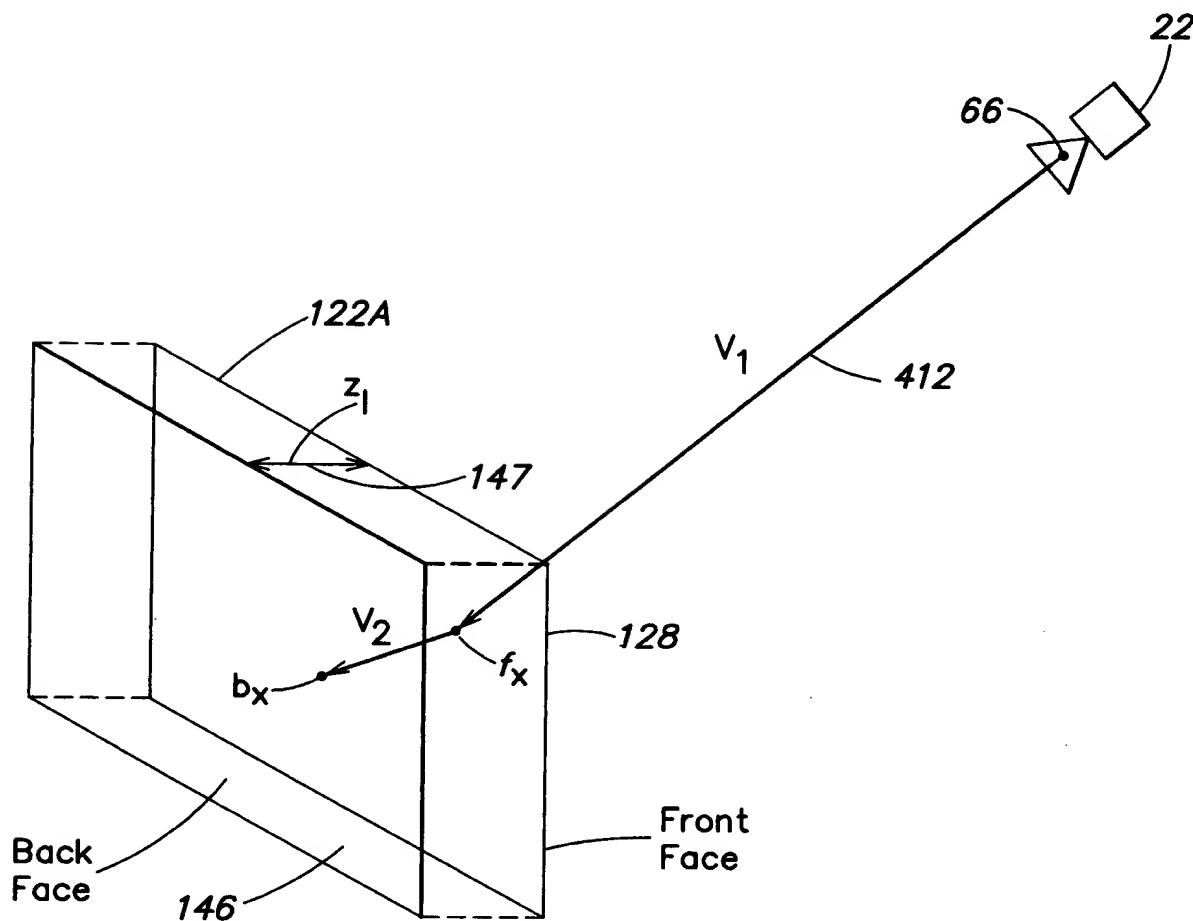


FIG. 37

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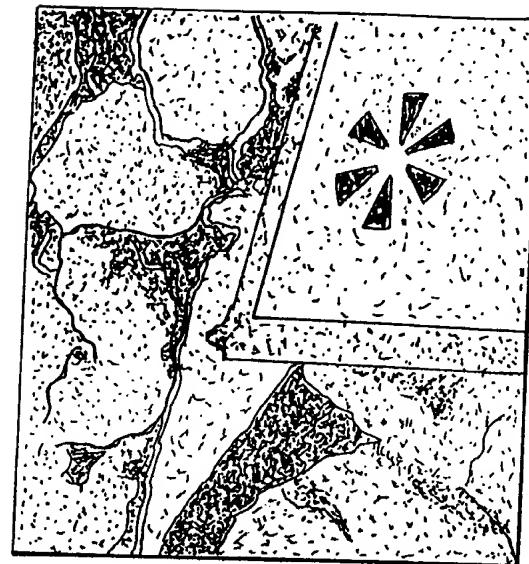


FIG. 38

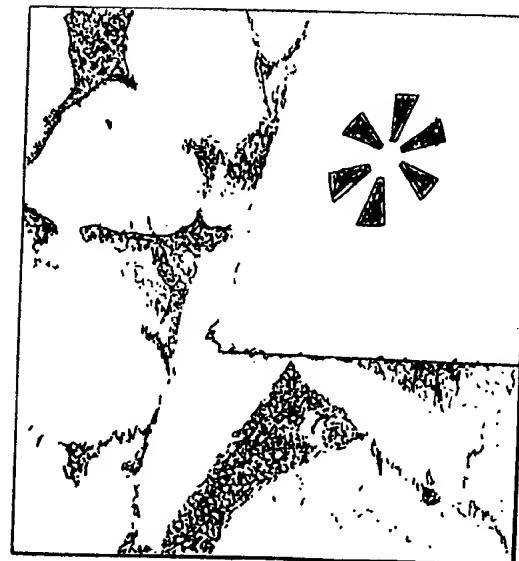


FIG. 39

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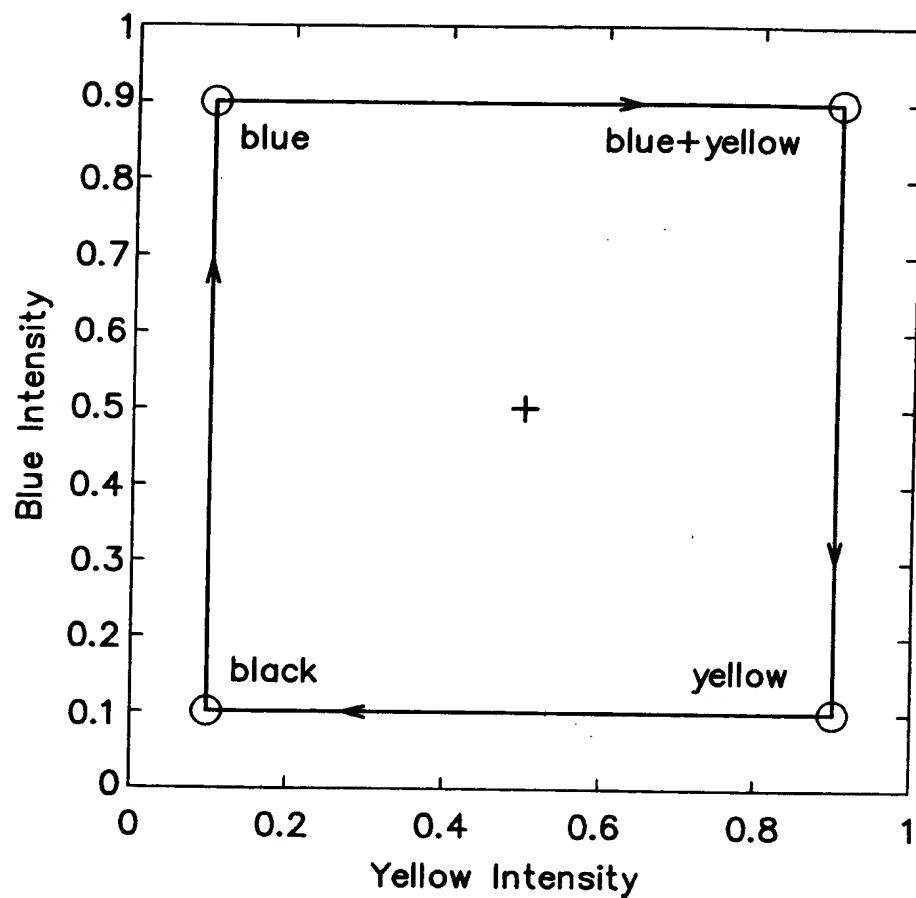


FIG. 40

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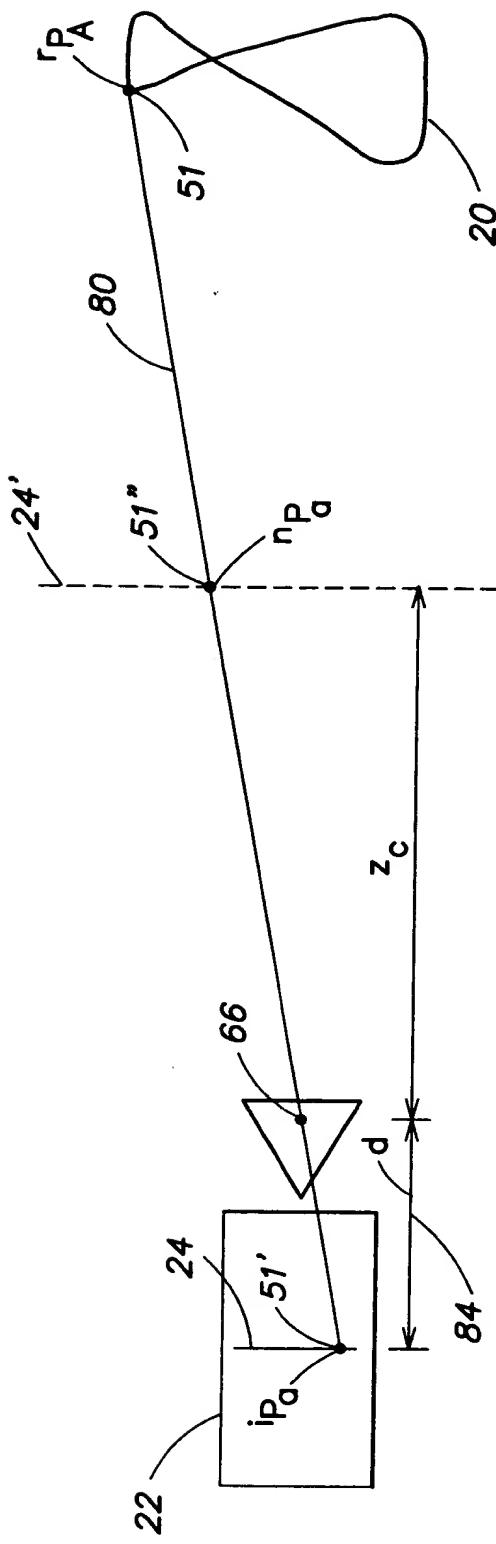


FIG. 41

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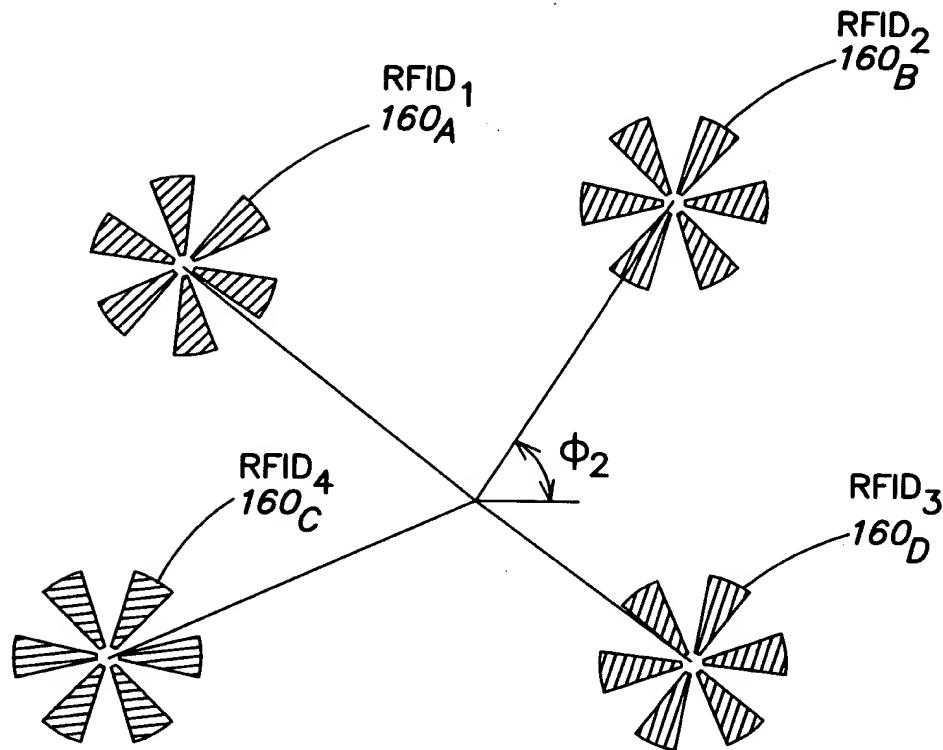


FIG. 42